The Newspaper of Information Systems Management
March 25, 1996, Vol. 30, No. 13, 174 Pages, $6/Copy, $48/Year

COMPUTERWORLD

By Lisa Picarille and Craig Stedman

Sun spots intranet

Tool rollouts ease deployment, development of applications

Calling Microsoft Corp. on the cyberspace carpet, Sun Microsystems, Inc. is about to unveil a slew of hardware, software and consulting services intended to simplify how users deploy Internet and intranet technologies, *Computerworld* has learned.

Tomorrow's announcement is designed to stop customers from heeding the siren song of Microsoft's Windows NT-based 'net products.

Onward and upward

It also marks a strategic shift for Sun that expands the Mountain View, Calif.-based vendor's focus beyond its Internet stronghold into the emerging corporate intranet arena.

Intranets are applications that make internal corporate use of the Internet, with Web browsers as the desktop user interface.

According to sources familiar with its plans, Sun's rollout will include Solstice World Wide Web server software, an Internet mail server, tools for developing enterprisewide applications based on Sun's Java programming language and 64-bit versions of the company's Netra Web server hardware.

On the way

Java WorkShop 1.1 is due to ship in July. It will support the Macintosh and add a GUI builder, a WYSIWYG HTML editor and a Java-to-C++ gateway.

Sun declined to comment on the announcement. But some users are eager for more details.

Michael Prince, chief information officer at Burlington Coat Factory, Inc. in Burlington, N.J., said Sun needs to make it easier to develop applications with Java and manage Internet/intranet applications.

"We use Sun products for our intranet, but we've had to integrate a lot of things on our own," Prince said. "In some cases, Sun has complete offerings, but it hasn't been packaged in a way that makes it easy."

"Java development will be easier to deal with when the tools are better," said Walter Herrick, a systems administrator at the University of California at Berkeley's Space Science Laboratory.

Some industry watchers said Sun needs to make a loud and clear state-

Intranets, *page 16*

Marty Gephart and Mark Mortland *helped automation take flight at Southwest*

Airline turbocharges schedule efficiency

By Thomas Hoffman

The best on-time performance. The fewest customer complaints. The lowest number of lost bags.

Southwest Airlines Co. has snared the U.S. Department of Transportation's coveted "Triple Crown" of airline service awards for an unprecedented four consecutive years (see chart, page 137).

To keep a firm grasp on its No. 1 ranking, the Dallas-based airline recently automated a gaggle of flight scheduling processes under an information systems project expected to deliver up to 20-to-1 productivity gains.

And in keeping with its discount image, Southwest has so far spent a mere $300,000 since February 1995 to develop its new systems. That's more than cost-effective when com-

Airline, *page 137*

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IBM ghosts haunt CEO

By Craig Stedman and Michael Goldberg

Lou Gerstner may have brought IBM back from the brink, but the company is still paying for past mistakes and playing catch-up in the race for technological leadership.

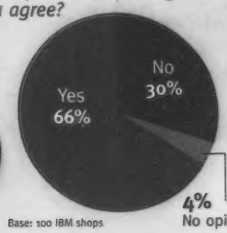
In the three years since he became chairman, Louis V. Gerstner has changed IBM drastically, and mostly for the better, according to interviews last week with two dozen users and analysts, and an exclusive *Computerworld* survey of 100 information systems executives at IBM shops.

But in areas such as client/server software, PCs, networking and mainframe storage, IBM is still struggling to make up for the time it frittered away before Gerstner arrived in Armonk, N.Y.

IBM, *page 14*

Lou Gerstner says the Internet will bring the market back to IBM because of the need for large servers. Do you agree?

COMPUTERWORLD User Pulse EXCLUSIVE SURVEY



Base: 100 IBM shops

NCR customizes data warehouses

By Jaikumar Vijayan

You might call it Data Warehousing 101.

NCR Corp. in Dayton, Ohio, this week will introduce a nuts-and-bolts program for every corporation that ever wanted to build a data warehouse but didn't know where to start.

The company will provide a menu of integrated hardware, software and services from which a custom warehouse can be developed. The program lets users scale up from small, relatively inexpensive prototype projects that start at $30,000 to multimillion-dollar custom warehouses that contain terabytes of data.

"It's a great approach because it allows you to

Data warehouses, *page 137*

You *can* solve the year 2000 problem – if you

like The Equitable's Bill Born

See Managing, page 83

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Inside Computerworld

March 25, 1996

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Compaq joins vendors slashing prices, making this a great year to buy notebooks.

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Governments will inevitably try to place restrictions on Internet traffic — but it won't work, and it might even backfire, technology guru James Martin argues.

138 Unix fractures
Fault lines remain evident throughout the Unix community, Charles Babcock asserts.

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TechnoTrivia
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Microsoft's original name for Windows?
The answer is in these pages! Now through May you can play COMPUTERWORLD's game of information retrieval — and turn trivia into treasure!
See page 104 for "everything you need to know to win!"

Choice Cuts

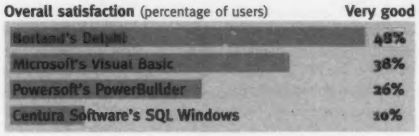
SOUND OFF!

Some IS execs think OOP *is the key to building successful applications. Others say no way. Who's right?*
See In Depth, page 101

JOHN A. STRAND III

MARTIN A. GOETZ

While a new generation *of client/server development tools promises to help extend client/server applications to the enterprise, Borland's year-old Delphi is scoring points with developers at the workgroup level.*



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Paths to programming success! *Author and CEO Gene Wang offers programmers valuable insight into what it takes to succeed and get ahead with his new book,* The Programmer's Job Handbook. **See Careers, page 107**

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Nasdaq's Robert J. Hughes, left, and Anthony W. Szerszen

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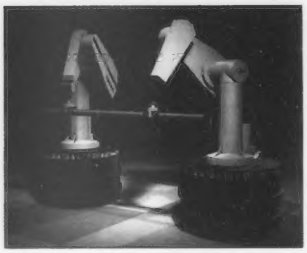
Meet Romeo and Juliet



Researchers at Stanford University have developed a pair of mobile robots that can wash windows, pick books off shelves and dust furniture — relatively delicate tasks by robot standards. Romeo and Juliet can cooperate on tasks that can't be done alone, such as moving large objects. The robots were created by Stanford roboticist Oussama Khatib and his students. Their work is part of a National Science Foundation program aimed at designing brawny robot assistants for moving bulky objects under human supervision.

Go out for a SPIN

In community meeting rooms across the country, small groups of software professionals gather after hours to discuss ways to improve their craft. The regional groups are Software Process Improvement Networks, or SPINs. Topics include programming tools and metrics, software quality and testing. Some of the urban SPINs include the following:

- Pittsburgh: Contact Dawna Baird at **dbaird@sei.cmu.edu**. (She's an excellent contact regarding the SPIN movement.)
- Boston: Contact Donna Johnson at **johnsond@tiac.net**.
- Chicago: Contact Kenneth Goncharoff at **gonch@tellabs.com**.
- Los Angeles: Contact Thomas Kudlick at **kudlick@cp10.es.xerox.com**.

But this is just a sample. There are many other regional SPINs, and new ones are being formed all the time in cities from Fairbanks, Alaska, to Birmingham, Ala. A complete list is available at the Software Engineering Institute's Web site, **http://www.sei.cmu.edu/participation/spins.html**.

Patent watch

These recently issued U.S. patents were gleaned from MicroPatent's Patent Server at http://www.micropat.com. (Number, inventor/assignee, date issued)

A compact keyboard for handheld computers that allows for one-handed touch-typing. The keys operable by the left hand alternate with the keys operable by the right hand. (5,497,151, IBM, March 5)

A computer time-clock system that alerts supervisors when an employee has worked beyond a certain time limit; can be used to prevent labor law violations. (5,497,141, Timecorp Systems, March 5)

An automated supermarket checkout counter that weighs and scans a product and compares it with a database of product characteristics. (5,497,314, Jeffrey M. Novak, March 5)

A system to monitor vehicle driver performance. An onboard computer collects performance data from several sensors to identify reckless driving habits. (5,499,182, Jeffrey Ousborne, March 12)

■ **Send contributions of offbeat news, lists and anecdotes to mbetts@cw.com.**

A turn-by-turn navigational system from Siemens Automotive will be installed in some luxury rental cars this summer. TetraStar (pictured) uses global positioning satellites, a gyroscope and an onboard database of roads to give drivers directions to their destinations.

Digital Frontiers

All St. Barnabas Hospital wanted to do was run a network from its data center to two buildings 300 feet across the street.

But the Bronx, N.Y., hospital couldn't dig up the street to lay cable, and it couldn't run aerial cables among the buildings, says Mark Smith, communications manager at St. Barnabas. So the hospital installed a laser-beam LAN. The wireless LAN from Laser Communications in Lancaster, Pa., uses infrared beams for line-of-sight data transmissions among the three buildings.

Smith says the laser LAN was cheaper than microwave technology and didn't require regulatory licensing to be installed. Better yet, it operated without interruptions during this winter's snowstorms, torrential rains and high winds, Smith reports.

Airline clubs: Who offers what?

Airline	Computers and printers
American Admirals Club	Both free at all U.S. locations
Northwest WorldClub	Both at most locations
Continental Presidents Club	Printers only (credit-card-operated)
United Red Carpet Club	Printers only (credit-card-operated)
Delta Crown Room	None, but will add printers soon
USAir USAir Club	None

Source: April 1996, *Mobile Office*, New York.

News shorts

Spyglass to stir browser war

Fighting an image as an Internet also-ran behind **Netscape Communications Corp.** and others, **Spyglass, Inc.** plans to spice up its Web browser next month. The Naperville, Ill., vendor will unlock pieces of its Spyglass Mosaic browser so users can snap in other vendors' components for reading newsgroups, sending electronic mail and other Internet tasks.

Netscape's Navigator allows outside pieces to be used, but the browser works best with Netscape's own pieces. Spyglass plans to announce on April 15 a set of application programming interfaces for building add-on modules for its browsers.

Microsoft Corp.'s Internet Explorer browser is based on Spyglass Mosaic, but that agreement will end with Version 3.0 of Explorer, which is due by midyear. In the meantime, "we want to distance ourselves from Microsoft and Netscape," a Spyglass source said.

PacBell tries networks

Pacific Bell this week will kick off a service to help customers plan, install and manage complex multivendor networks.

What sets Pacific Bell Network Integration (PBNI) apart from similar ventures by regional carriers is its customized support packages. The first helps users link remote LANs to home base. The second helps users connect to the Internet or build intranet services.

"Targeting these needed packages toward particular customers makes them unique," said Traci Bair, manager of the network support and integration services program at International Data Corp. in Framingham, Mass.

"We wanted a single point of contact so when a problem hits our network linking 22 hospitals, we don't have to call five different carriers," said Fred Hassard, network communications manager at Adventist Health in Roseville, Calif.

MCI, Netcom match pricing

The Internet is starting to look like a cheap diner, where the motto is "all you can eat for 20 bucks."

Last week, **MCI Communications Corp.** and **Netcom On-Line Communications Services, Inc.** each announced dial-up Internet access charges of $19.95 per month for unlimited usage.

In recent weeks, **AT&T Corp.** and **CompuServe, Inc.** have also priced their Internet offerings at $19.95 per month for unlimited usage. "This provides more people with immediate access and means to get on the Internet," said Gary Nielsen, manager of marketing programs and special events at Ford Motor Co. in Detroit.

For more **News shorts,** *see page 8*

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Laptop prices slip, slide

Compaq jumps on bandwagon; users wait for pressing need

By Mindy Blodgett

This is shaping up to be a great year to buy notebook computers. Compaq Computer Corp. last week joined the growing list of vendors that are cutting notebook prices when it slashed the price of its midrange offerings by 28%.

Pundits stopped short of calling it a price war, but it certainly looks like a buyer's market as prices could drop even lower. However, users shrugged off the news, saying their purchases will be based more on internal business needs than plummeting prices — much the same view they took on desktop price cuts [CW, March 11].

In the past two months, IBM PC Co., Digital Equipment Corp., Texas Instruments, Inc., Toshiba America Information Systems, Inc., NEC Technologies, Inc. and Hewlett-Packard Co. have announced price cuts — in all pricing levels and product lines — ranging from 5% to 20%.

Analysts and vendors said many notebook makers are clearing out inventory, ramping up new lines — including new ultraportables — and migrating to faster chips.

Vendors are also grabbing for market share in an increasingly competitive market, analysts said. Notebook makers last year faced a softer market than expected and a difficult transition to Intel Corp.'s Pentium microprocessors. Sales growth for notebooks was a relatively sluggish 15% last year.

In contrast, analysts from Dataquest, Inc. in San Jose, Calif., last week predicted the notebook market will post a healthy 30% gain this year. As new players such as Hitachi PC Corp., Fujitsu Ltd. and Sony Corp. enter the fray, the battles will grow even more fierce, analysts said.

"We haven't seen anything yet" in pricing, said Bruce Stephen, an analyst at International Data Corp. in Framingham, Mass. "It's going to get a lot messier. There will be more of this price compression as everybody jockeys for position."

Users said the price cuts are welcome, but they said they will buy notebooks only when there is a pressing need.

"I've been monitoring the prices," said George Staton, assistant vice president of Commerce Bank in Cherry Hill, N.J. "Certainly you'd like to get the most for your money. But the business units drive this buying now, not [the information systems department]. So when they want notebooks, we buy."

Kevin Danahy, manager of workgroup application development at Millipore Corp. in Bedford, Mass., agreed. Nevertheless, he said, it's nice to be in the driver's seat when it comes to pricing.

"We're certainly getting better notebooks for our money," Danahy said. "And we've learned our lesson here. Notebooks now depreciate after about two years, so we turn them over a lot."

Compaq's price cuts are part of a corporate strategy to halt a sales slowdown across its product lines. Much of Compaq's troubles came from depressed portable sales, which account for less than 17% of corporate revenue. That is down from 35% in the early 1990s.

Compaq had a commanding lead in the notebook market but was overtaken by Toshiba.

"It's fair to say we have taken our eyes off portables a little bit," said Eric Shuster, portable product marketing manager at Compaq. He said the company had focused on its server and desktop lines but is bearing down again on its once-vaunted portable lines.

Going mobile

The Top 5 mobile computer vendors by worldwide shipments

	Shipments	Market share	Shipments	Market share
Toshiba	1.2M	14%	1.5M	15%
Compaq	1.06M	12%	1.04M	11%
NEC	729,000	8.4%	994,000	10%
IBM	851,000	9.8%	983,000	9.9%
Apple	644,000	7%	661,000	6.7%
Total units shipped	8.6M		9.9M	
	1994		1995	

Source: Dataquest, Inc., San Jose, Calif.

Upcoming Pentium servers are aggressively priced. See page 45.

Users warned: Intranet suites run the gamut

By Kim S. Nash

The notion of an intranet suite — a software and/or hardware bundle intended to give information systems departments an instant intranet — is all the rage among vendors lately. But an intranet-in-a-box is a little like a jack-in-the-box: You don't know what's going to pop out when it opens.

Silicon Graphics, Inc. (SGI) introduced a suite last week. World Wide Web server maker Process Software Corp. is expected to announce one next month. Smaller vendors, such as NetManage, Inc. and FTP Software, Inc., also offer such sets. Since no two are alike, users need to be on their toes.

"There's a real difference in terms here that can be confusing if you don't watch out," said Cecil Murray, an independent contractor helping to build several intranet applications at Georgia-Pacific Corp. in Atlanta.

For example, SGI's WebForce Intranet includes the company's Unix machine and a Netscape Communications Corp. Web server. But the suite has no firewall, an essential security prerequisite for internal corporate use of the public Internet.

Different approach

NetManage in Cupertino, Calif., meanwhile, takes a different, more desktop-oriented tack. Its Chameleon suite includes electronic mail, a Web browser and a handful of other utilities — but no Web server.

But before users even start to compare the suites, they need to decide whether a suite, vs. a best-of-breed strategy, is the best approach to building their intranet.

Vendor-configured suites by definition rarely combine the best products in each category, said Gordon Benett, a lead consultant at Web consulting firm Techne Group in Waltham, Mass.

An intranet suite is "OK, as long as your company is not locked into a single group [of products] that cannot be changed later," said a Web coordinator at an Indianapolis firm that is building several intranets for the U.S. Army and the Department of Defense.

Murray agreed: "I don't want to be wired into one vendor's view of what an intranet is."

But for some users, intranet suites are just plain easy. "You deal with one vendor, one support center and one price," said Matthew Cutler, founder of the Webmasters Guild, a Cambridge, Mass.-based professional group for Web workers.

Those users who opt instead for a suite should look for the following features, analysts said:

- **Integration.** The operating system, Web server and administration utilities should be aware of one another so they can be monitored and managed as a unit.
- **Simple support.** If a vendor resells another vendor's product, make sure you know who is accountable when trouble starts.
- **An escape hatch.** Sets that let users snap in different databases, messaging systems, workflow packages and even Web browsers and servers are the most flexible.

How suite it is

Intranet suites can vary remarkedly

	NetManage Cupertino, Calif.	Open Text Waterloo, Ontario	Silicon Graphics Mountain View, Calif.
	Chameleon	Livelink	WebForce
Web server		✓	✓
Web browser	✓	✓	✓
Hardware			✓
Content management utilities		✓	✓
Firewall			
HTML editor		✓	✓
Document management		✓	
Network connection software	✓		
Starting price	$400	$12,500	$12,995

Internal growth

The number of intranets outpaces the number of external Web sites, says a survey from O'Reilly & Associates. A poll of 1,000 companies showed that 37% of large, and 23% of midsize, firms run at least one Intranet. Large companies are those with 1,000 or more employees; midsize companies have 101 to 999 workers. More details can be found at http://www.ora.com/survey.

A Web database server bows. See page 73.

Clarification

Novell, Inc., which didn't comment at press time on an Inside Lines item two weeks ago regarding the number of attendees Microsoft Corp. was allowed to send to the Brainshare conference, has issued the following clarification: "Microsoft was not limited to 10 attendees — they were allowed to send 25 registered attendees to Brainshare. This is the maximum number we allot to all companies."

The Novell spokesman said this was a departure from Novell's previous policy, which limited other vendors to sending only 10 people to Brainshare.

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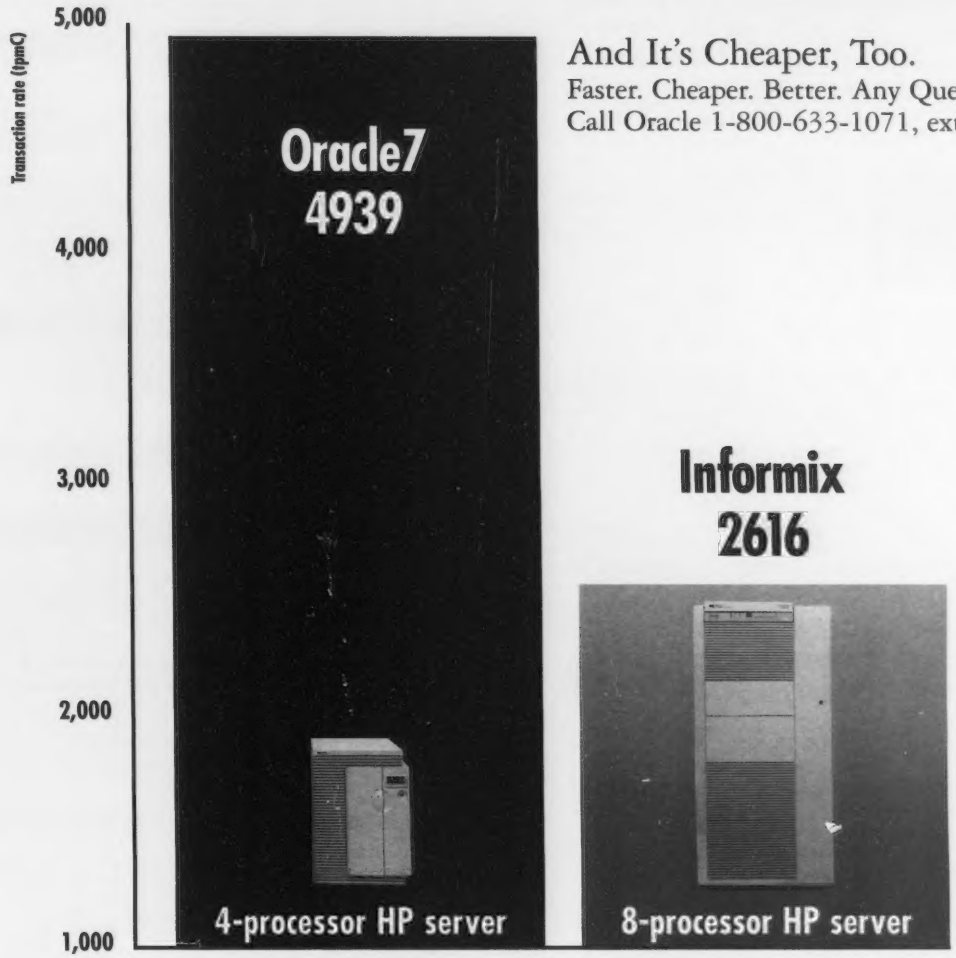

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Expo touts tools to build next-generation networks

By Bob Wallace

The noise from the show floor at Networld/Interop '96 next week in Las Vegas may drown out the din from the casinos, as vendors unveil wares that let users build next-generation networks.

These products will be cheaper, faster, more powerful and more flexible than today's network building blocks.

Cabletron Systems, Inc., IBM, Novell, Inc., Optical Data Systems, Inc. (ODS) and Bay Networks, Inc. will lead the charge with a broad array of offerings, some of which will be available in two months.

• **Cabletron** in Rochester, N.H., will outline its plan for SecureFast Virtual Networking, which will let users build virtual networks.

With virtual networks, routing intelligence is built in to the switch, which obviates the need for routers. This can cut costs and simplify network administration.

The software/hardware upgrade will enable Cabletron's existing switching hubs and standalone LAN switches to support SecureFast Virtual Networking.

Cabletron will also push Version 4.0 of its distributed Spectrum platform. Spectrum users will get an enterprisewide view of the network for key management applications, an NT-based server option and reports accessible via the Web.

• **IBM** in Armonk, N.Y., and **Novell** in Orem, Utah, will jointly announce NetWare for SAA for IBM's AS/400 minicomputers, which essentially is an improved version of Novell's LAN-to-minicomputer software package.

IBM sources said the package will be easier to use and configure and will cost less than half as much as its predecessor. The firms are moving to a per-user, instead of a per-session, pricing structure but didn't offer details.

"With the old pricing structure, [the package] cost roughly four times more than Microsoft's SNA Server package," a Novell source acknowledged.

The software, designed for lower-end AS/400 users, will ship in two months.

• **Hewlett-Packard Co.** will unveil the long-awaited distributed architecture for its OpenView platform. This version will scale to cover very large networks. HP hopes to ship it by June.

• **ODS** in Richardson, Texas, is preparing the Massively Parallel ATM Matrix Backplane, a 41G bit/sec. switching fabric designed to eliminate network bottlenecks that some users have encountered when using ODS' Infinity switch for LAN switching.

Users can upgrade their Infinity switches in the field for $3,300, according to ODS. The vendor will announce a variety of LAN switching modules that will give users high-end switching at low-end pricing (see chart).

For example, a new Infinity module slashes the price of the vendor's Ethernet switching from more than $700 per port to about $300 per port.

The switching hub vendor also will lay out its multifaceted virtual networking blueprint, which analysts say will position ODS well against Cabletron, Cisco Systems, Inc. and others.

• **Bay Networks** in Billerica, Mass., is expected to burst onto the scene with a line of Internet-related products designed primarily for large corporate users and the swelling ranks of Internet service providers.

Sources said Bay also will announce a huge deal to provide its high-end Backbone Concentrator Node routers to Advanced Network & Services, Inc. (ANS) in Elmsford, N.Y., which is owned by America Online, Inc.

ANS runs a national 45M bit/sec. fiber network that makes up part of the Internet. The Bay routers may allow ANS to provide cheaper Internet access services.

Flip the switch

Optical Data Systems' ambitious LAN switching plan

PRODUCTS	PRICE	AVAILABILITY
ETHERNET SWITCHING MODULES		
12 switched Ethernet ports with ATM Matrix link	$11,995	April
32 switched Ethernet ports	$9,600	June
24 switched Ethernet port, 2-port 100Base-T Switching Module	$9,100	June
12 100Base-T port full-duplex switch	$7,200	June
ATM25 modules		
12 ATM25 ports, 1 155M bit/sec. connection	$11,995	April
32 ATM25 ports, 1 155M bit/sec. connection	$15,995	October
TOKEN RING SWITCHING MODULE		
6-port Token Ring switching interface	$13,275	April
FDDI SWITCHING MODULES		
1- to 8-port FDDI modules	$11,925 to $16,425	April

News Shorts

Judge confirms CA's RICO violation

A New York State Supreme Court judge last week upheld a ruling that **Computer Associates International, Inc.** must pay a $12 million arbitration award to four software developers. Last September, an arbitration panel found that CA had violated the Federal Racketeer Influenced and Corrupt Organizations (RICO) Act and had fraudulently concealed transactions related to the DataVantage application tool to avoid making royalty payments to the developers. CA said it plans to appeal the decision.

IBM to rescue AT&T workers

IBM has agreed to pick up 3,000 **AT&T Corp.** workers who were to be laid off as a result of AT&T's split into three companies. IBM made the offer as part of a 10-year, multibillion-dollar contract for its Integrated Systems Solutions Corp. to manage AT&T spin-off Lucent Technologies' in-house computer system.

Cisco adds ATM features

Cisco Systems, Inc. last week moved much closer to bringing Asynchronous Transfer Mode (ATM) to the masses by announcing an ATM interface for its mid-range 4500 and 4700 routers. With the interface, users with Ethernet and Token Ring LANs will have access to ATM networks. Until now, ATM interfaces have been available only on high-end Cisco routers. The interfaces cost $12,500 and are shipping.

Compaq to integrate DMI

Compaq said it would integrate Desktop Management Interface (DMI) 2.0 into its desktop and server management utilities, eventually replacing its own specification.

Compaq cuts server prices

Continuing its drive to maintain market share, **Compaq Computer Corp.** last week reduced prices on its low-end server line by as much as 10%. Compaq cut the price of an entry-level ProSignia 500 server from $4,439 to $3,999. Compaq, in Houston, also announced several Pentium Pro upgrade offers as an investment protection for current purchasers of its high-end ProLiant 4500 server line.

Microsoft to ship Exchange

Microsoft Corp. will start shipping its Exchange Server before the end of the first quarter, as promised. Microsoft will ship pieces of the messaging and groupware package this week, although Exchange won't be announced officially until next week's Networld/Interop '96 conference.

IBM cuts wireless deals

IBM reached agreements with several mobile service providers to offer one-stop wireless shopping to users. Agreements with companies such as **AT&T Wireless** and **Ericcson Corp.** mean that IBM can offer end-to-end programs for wireless communications implementations, including planning, design and management.

AT&T plans Internet Notes

AT&T confirmed last week that it will support **Lotus'** Notes as part of its WorldNet Internet offerings this year. AT&T dumped its proprietary Network Notes service last month but said it would still work with Lotus on development issues and look to include Notes services as part of AT&T's Internet services.

Cabletron joins $1B club

Revenue at **Cabletron Systems, Inc.** reached $1.069 billion in fiscal 1995, a 32% jump from fiscal 1994 for the Rochester, N.H., switching hub maker. Net income was $216.7 million, up from $162 million in fiscal 1994.

IBM's rolls out OS/2 browser

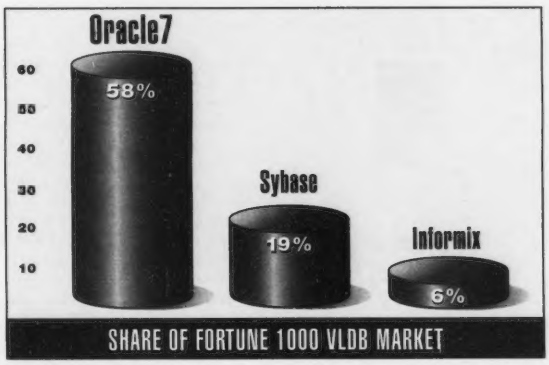
IBM unveiled an OS/2 World Wide Web browser that supports Java, the Internet development language from **Sun Microsystems, Inc.** The browser, dubbed WebExplorer with Java, lets users download and run the same Java applets that run on Sun's HotJava browser and Netscape Navigator 2.0 from Netscape Communications Corp. in Mountain View, Calif. The Java-enabled WebExplorer requires the OS/2 beta version of Java.

SHORT TAKES **Microsoft** gave Internet capabilities to its Access database. ... **Mergent International, Inc.** in Rocky Hill, Conn., and **Utimaco Safeware Group** in Oberursel, Germany, today will announce their merger.... **Digital Equipment Corp.** this week will introduce ClearVISN, the first products to manage its enterprise virtual intelligent switched network architecture.

Data Warehouse Comparison

Data warehouses are central information repositories for storing and analyzing vast amounts of historical and reference data from a number of different sources. Oracle7 has many more features for data warehousing than any other DBMS.

Features	ORACLE7	Sybase System 11	Informix 7.2
Production Terabyte Databases Supported	Lots	Zero	None
Scalable SMP Support	Yes	Not Quite	Yes
Scalable MPP Support	Yes	No Way	No
Parallel Query	Yes	Nope	Yes
Parallel Load	Yes	Yes	Yes
Parallel Index	Yes	No	Yes
Fault-Tolerant Parallel Server	Yes	Never	No
Parallel User-Defined Functions	Yes	Nope	No
Bit-Map Indexes	Yes	Yes	No
Star Query Optimization	Yes	No Way	No
Integrated Replication	Yes	No	No
OLAP/Multidimensional Support	Yes	Sorry	No
Video Storage & Playback	Yes	Nyet	No
Text Storage & Search	Yes	Not	Yes
Spatial Data	Yes	Never	No



Study fielded 6/26–9/1/95. Based on a census of the F1000 who are running UNIX and have a single DB ≥ 50GB. Source: IDC.

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'net to dominate client/server conference

Products, strategies will be on view in Boston

By Julia King

Forget databases and traditional client/server applications.

The Internet and the World Wide Web will take center stage at this week's Database and Client/Server World conference in Boston.

To no one's surprise, almost every exhibitor is either unveiling or demonstrating Internet products.

Additionally, more than a dozen analysts and software executives will speak on Internet topics, such as using the Web as an alternative to groupware and developing Internet-based commerce applications.

On the applications side, vendors, including Lawson Software in Minneapolis and Software 2000 in Hyannis, Mass., will demonstrate how to access client/server systems via browser-based clients.

On the development side will be products for building Web-based server applications that require no client software.

"This is by far the more interesting aspect of the Internet and applications ... [because] it makes applications development and deployment a lot easier and a lot less expensive," said Richard Finkelstein, president of Performance Computing, Inc. in Chicago.

For example, users can deploy server-based applications to multiple desktop devices, such as Windows-based PCs, Macintoshes and Unix machines, without having to write different types of client code.

Server savings

Maintenance costs also decline sharply because system upgrades and changes are made only to a server and not to each individual client machine.

"If there is any problem, it only has to be fixed in one spot. You don't have to renovate thousands of PCs. You also get rid of the problem of upgrading hardware and operating system software every two years," Finkelstein said.

Where the money is

Large companies' client/server budgets will grow 28% this year, according to Sentry Market Research in Westboro, Mass. Overall, client/server spending will make up 50% of all software spending, Sentry says.

Also at the show, JYACC, Inc. in New York will showcase its Jam/Web development environment. It lets users build and deploy server-based applications that automatically generate Hypertext Markup Language for display on any type of browser software.

What differentiates the Jam/Web development product from other Web application tools is its ability to work with any browser software and database, according to JYACC. Jam/Web is scheduled to ship in April at a price of $2,400 per developer.

Empress Software, Inc. in Toronto will unwrap Empress DataWeb, a Unix-based set of point-and-click tools for developing Web pages and archiving data on customers and other users who visit a Web site.

The kit consists of the Empress relational database management system, Empress Hypermedia authoring software, SQL Server software and the Apache Hypertext Transfer Protocol server software. The software comes on a single CD-ROM, which costs $997.

Internet-capable forms are on the way from JetForm. See page 57.

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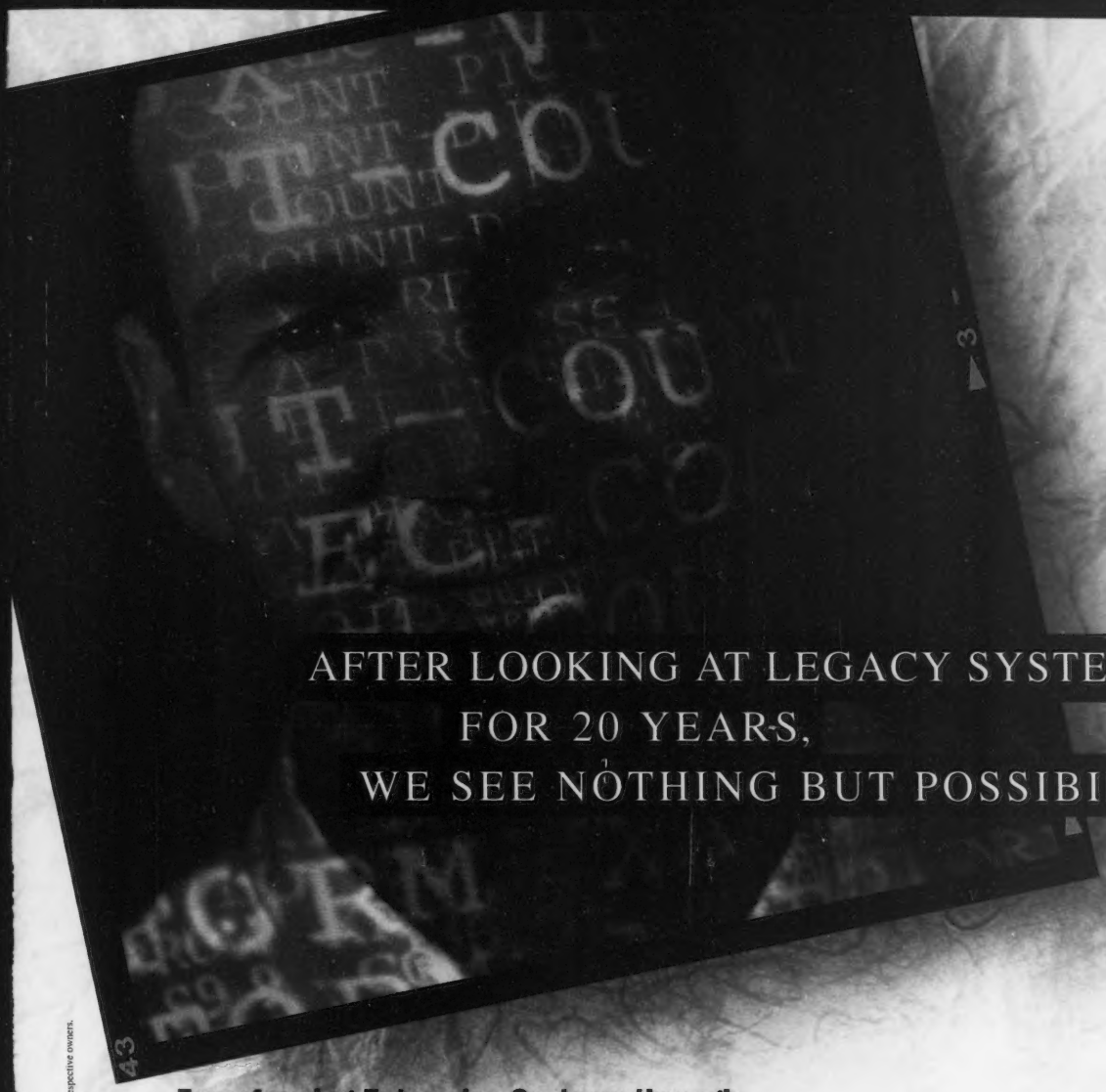

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Novell recasts itself as Internet guide

Fills in NetWare gaps; licenses Java, OM-Secure Link

By Laura DiDio
SALT LAKE CITY

It's back to the future for Novell.

Before an enthused crowd at its annual BrainShare conference last week, a newly unfettered Novell, Inc. again repositioned itself as an Internet company instead of an applications services firm.

Vowing that cyberspace will not be owned by "one" company — a thinly veiled reference to Microsoft Corp. — CEO Robert Frankenberg declared that the "Internet is LANs, and no one knows LANs like we know LANs."

Frankenberg touted the first server license for Sun Microsystems, Inc.'s Java scripting technology as well as a licensing and development pact to embed Open Market, Inc.'s OM-Secure Link electronic commerce technology in NetWare.

He also ticked off five key initiatives that would give users a one-stop solution. They include making LANs smart by enhancing NetWare, interconnecting smart networks, standardizing developer interfaces using Net2000, providing rich network access using GroupWise and its feature set, and deploying NetWare Embedded Systems Technology to extend network connections beyond standard LANs and PCs.

Users and analysts said the announcements filled in many of the gaps in Novell's tactical strategy, most notably direct links to Windows NT Server. But they complained that Novell did not articulate a cohesive plan of execution or detail how it will sell the "new Novell" beyond its installed base.

"Novell will make stuff for all intelligent devices, regardless of origin."
— Robert Frankenberg, Novell CEO

"In terms of trying to create a directory that ties multiple environments together, they're not doing that. It's good to put Java on NetWare, but it [doesn't] solve the longer, fundamental business problems Novell has," said Jamie Lewis, president of the Burton Group, Inc.

Still, some users said they were glad that Novell is on the move again — even if the moves at this point are defensive maneuvers to catch up to Internet service providers such as Netscape Communications Corp., according to John Oltsik, an analyst at Forrester Research, Inc. in Cambridge, Mass.

"Forging links to the Internet and extending [NetWare Directory Services] to run on other platforms is key for us because we need to link our local desktops to remote databases and servers, and the Internet is *the* way to do that in the future," said Steve Austin, MIS director at Helicopter Support Inc. in Orange, Conn.

Novell's latest alliances represent the first steps in moving NetWare beyond the client/server model, Frankenberg said. His plan is to move the server model to a "service model" and form a post-client/server architecture.

To achieve this goal, Novell must embrace an open architecture that delivers a Universal client, a Universal network and Universal services, Frankenberg said. Novell's ambitious client/network Internet blueprint calls for guaranteed quality of service, a secure infrastructure for the next generation of application servers and easy access to organized information anywhere on the enterprise.

In this new client/network model, NDS and the Net2000 application programming interface (API) will allow Java applications to be accessed, stored, managed and shared across the network. To address the electronic commerce market, Novell will integrate OM-Secure Link with its NetWare Web Server. This will give users security on the Web.

The company also launched the alpha version of its Net2000 API initiative. Net2000 gives developers an easy way to write NetWare applications across multiple platforms. It can also run Visual Basic applications.

Mark Herder, manager of data communications at the Dartmouth Hitchcock Medical Center in Lebanon, N.H., said if Novell doesn't deliver on the Internet and the Net2000 initiatives as well as maintain support among applications developers, "they won't be anywhere a year from now."

GroupWise XTD hits the beta trail

By Tim Ouellette
SALT LAKE CITY

At last week's BrainShare '96, Novell, Inc. provided users with their first glimpse of GroupWise XTD, which is now in limited beta testing.

The Provo, Utah, company hopes improved administration and the inclusion of document management and workflow features will sway users to upgrade from their current GroupWise 3.x and 4.x installations.

GroupWise 4.1 is messaging software based on file-sharing architecture, which, like competing products, can become unwieldy when scaling to large enterprises. GroupWise lags in third place in the LAN messaging market behind Lotus Development Corp.'s CC:Mail and Microsoft Corp.'s Mail.

XTD, based on a client/server architecture that frees up the client from much of the message-processing duties, is the upgrade path for 4.1 users.

At Auburn University, where the number of GroupWise users is 300 and growing, "the new [consolidated] administration features are something we are looking forward to," said beta tester Brian Anderson, an information technology specialist at the school in Montgomery, Ala. "As it is right now, GroupWise administration is kind of spread out, and you have to log in to certain servers to do certain tasks."

One new linking tool will automatically link a new GroupWise XTD mail domain with the domains already on the network. This currently is a time-consuming process done manually by GroupWise administrators.

The single point of administration for both the network and GroupWise XTD will help cut the cost of ownership for users, according to Eldon Greenwood, Novell's groupware product manager. But electronic-mail administrators may have to brush up on their NetWare.

All of GroupWise XTD's administration will take place from within the NWAdmin application in NetWare, making use of NetWare Directory Services. In fact, GroupWise XTD users will get first crack at the administration module found in Novell's NetWare upgrade due this fall. The module will ship as part of XTD.

Right now, Novell has to get the product out the door. Lotus' Notes 4.0 is on the market, and Microsoft's Exchange is due next week. GroupWise XTD is slated for delivery by midyear, though sources expect that to slip slightly to late summer or early fall, especially with Novell predicting a four- to six-month beta period.

Remote Monitoring gets distributed

Technically Elite adds 'missing link' to cover big networks

By Patrick Dryden

Managers of widespread client/server networks will get a powerful new way to monitor traffic flows and tie-ups this week.

Technically Elite, Inc. in Campbell, Calif., will unveil a PC-based turnkey product called DomainMeter 7000. Some call it the "missing link" in Remote Monitoring (Rmon) and troubleshooting technology because it provides an intelligent collection point for network traffic data.

Furthermore, network managers reportedly will be able to retrieve traffic reports via the World Wide Web rather than through an expensive network management console.

Problem solver

Technically Elite has identified and addressed a lot of problems — maybe too many, said Brian Burba, an analyst at International Data Corp. in Framingham, Mass.

"It's a great idea to drop this box into several network sites and link them all via the Web for direct reporting," Burba said. "But they're aiming high. It will be quite an accomplishment if they can pull it off."

With DomainMeter, those responsible for hundreds or thousands of network segments reportedly can designate Rmon collection points to gather, filter and act on each segment's performance data. As a result, central administrators won't get overwhelmed with too much data.

"This is the missing piece of the Rmon puzzle," said Greg Cline, director of network integration and management research at Business Research Group in Newton, Mass. "Users have needed Rmon agents that scale so they can establish domains to distribute management for their networks."

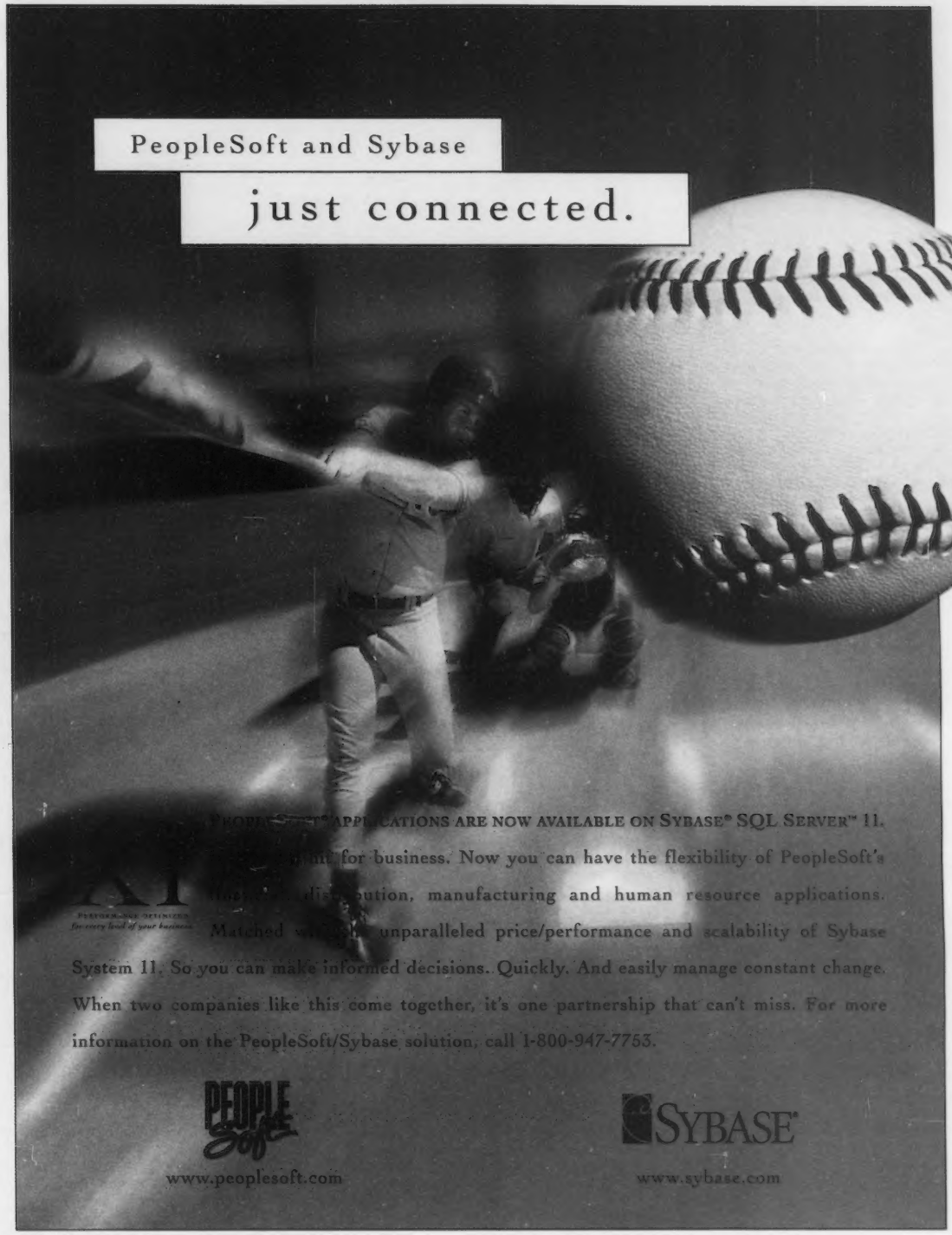
Founded in October, Technically Elite is the result of the merger of Network Application Technology and Technically Elite Concepts, Inc. and the companies' Rmon probes and agent software. Guiding the venture is President and CEO David Norman, founder of Businessland, Inc., Dataquest, Inc. and Creative Strategies International, Inc.

DomainMeter's "super probe" gathers Rmon utilization statistics from stand-alone probe devices and agents embedded in internetworking gear. It provides a data repository, expert system and monitoring application on a Pentium server, which users can configure remotely.

"We need this kind of scalability to monitor 273 subnets with 25,600 nodes," said Milt Mallory, network specialist responsible for performance analysis at Stanford University in Stanford, Calif. "We can't do everything from one box, and we need the redundancy of multiple boxes around campus to gather data from probes and agents."

DomainMeter 7000 also can poll devices that report via the Simple Network Management Protocol, Norman said. This lets managers combine diverse data in unique reports that could help them monitor, for example, the utilization of a specific router path. And DomainMeter has enough native intelligence to take action locally and automate management tasks, as well as pass up alerts to central administrators.

The packaged monitoring system costs $6,995. It requires Technically Elite's MeterWare analysis software for Windows and Unix-based systems.



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Bully for him!

Talk about a rekindled Wall Street romance.

IBM's stock price hit a five-year high of $128.88 in late February, amid a general upsurge of high-tech issues. While the stock has fallen about 10% since then, the company's financial picture is a continent away from the days when Louis V. Gerstner took over as CEO in the dismal spring of 1993.

Financial analysts say Gerstner has made some smart moves, including cutting costs and nixing a breakup plan.

A reinvigorated IBM is also devoting more resources to professional services and building next-generation mainframes using CMOS technology. Both areas provided revenue growth last year and could continue that trend this year.

For example, services grew 31%, to $12.7 billion, in 1995 and became IBM's second-biggest revenue center. And hardware sales grew 10%, to reach $35.6 billion.

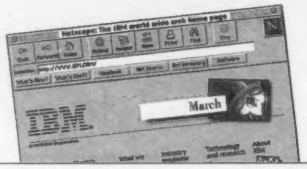
Looking toward future areas of strength, analysts had mixed views. "I wouldn't say that IBM is in a real leadership position yet with some of the interesting things going on in the Internet or with intranets," said Martin Ressinger, an analyst at Duff & Phelps Investment Research in Chicago. "But there's a lot of [IBM] hardware out there."

One of IBM's key strengths remains its trusted brand name with medium-size and large companies looking to buy dependable departmental and enterprise servers. Even the IBM PC Co., which has been a perennial weak area for the firm, is showing growth potential with its emphasis on higher-margin PC servers.

— Michael Goldberg

Life with Lou

Key events during Louis V. Gerstner Jr.'s years at IBM



1993

MARCH
IBM names Gerstner to replace John Akers as chairman

APRIL
Gerstner halts Akers' plan to break IBM into autonomous units

AUGUST
IBM takes $8.9 billion restructuring charge; announces plans to cut 60,000 workers by end of 1994

SEPTEMBER
New management committee created to oversee cross-business integration and product plans

DECEMBER
IBM combines server operations into single unit; sells federal division for $1.6 billion

1994

JANUARY
IBM reports a return to profitability in fourth quarter of 1993

APRIL
Introduces new family of CMOS-based mainframes

MAY
Reorganizes sales and service operations into vertical industry units

IBM ghosts haunt CEO

CONTINUED FROM PAGE 1

"Three years ago, you mentioned IBM and everybody looked at you like you were talking about a dinosaur," said M. Lewis Temares, chief information officer at the University of Miami. "Now they're in the same boat as everybody else. But that doesn't mean you exclude the Suns or the HPs or the Dells."

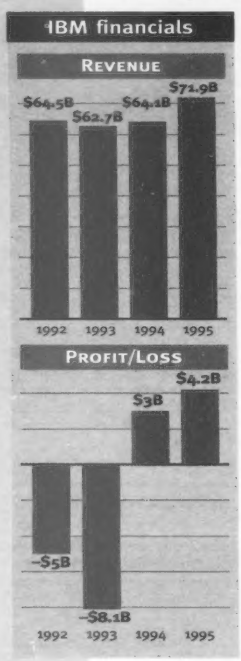
There is almost universal agreement that IBM is better off today — both financially and strategically — than it was before Gerstner's hiring.

The former RJR Nabisco executive gets widespread credit for cutting costs, shaking up the complacent IBM culture and forcing its different divisions to work in relative harmony. He also caught a major break when the mainframe made its recovery in 1994.

Sixty-eight percent of users surveyed by *Computerworld* said Gerstner has been effective at improving IBM's financial health. But only 48% rated Gerstner as effective in leading IBM into new technology areas, and just 28% said he has done a good job of sharpening the company's customer focus — one of his top priorities.

Interviews with users and feedback from the survey point to several areas where IBM still faces demons:

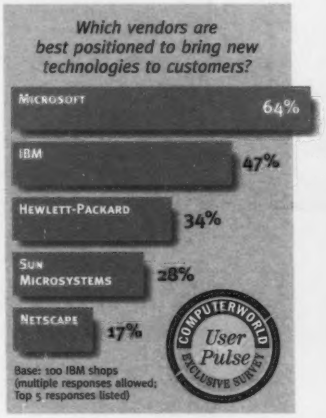
- The Internet and corporate intranets are great opportunities, but IBM's technology and market presence have lagged behind vendors such as Sun Microsystems, Inc.
- Despite its June 1995 acquisition of Lotus Development Corp. and its Notes groupware, IBM has yet to prove it can become a heavyweight in client/server software.
- Service and support remain sore spots for a significant percent of customers, who are feeling the pinch of IBM's staff cutbacks. And customer loyalty has been frayed by IBM's missteps in key areas such as mainframe storage and networking hardware.



Survey supports 'net strategy

A majority of survey respondents agreed with Gerstner's much-publicized contention that the Internet will shift the market back toward large servers. But some users and analysts said that doesn't necessarily mean IBM will be the first choice of customers (see story at right).

For example, Brigham Young University in Provo, Utah, plans during the next five years to move from a mainframe to a client/server setup with Unix servers and PCs with Internet access. "I could go to lots of places for that technology," said Kelly McDonald, executive director of university computing services at the school. "At this point, I wouldn't say we automatically look



The Eagle soars . . .

By Craig Stedman

Project Eagle, IBM's long-promised attempt to make its client/server software less expensive and easier to install, is finally ready to leave the nest.

Six months behind schedule, IBM this week will introduce a multiplatform line of IBM Software Servers that combines almost 60 products in seven integrated and pretested packages designed to take on Microsoft Corp.'s Windows NT-based BackOffice suite.

The two suites are similar in scope, although Microsoft lacks a transaction manager and a groupware server that matches Notes. IBM also is making it easier than Microsoft does for customers to use rival products alongside its servers, analysts said.

Code-named Project Eagle, IBM's suite includes servers that handle Notes, databases, transactions, Internet access, communications, systems management and directory/security. The bundling is a key part of IBM's strategy to shed its lightweight status in the client/server software market.

"It's not like there's any technical innovation here. It's just a repackaging," said Sally Cusack, an analyst at The Standish Group International, Inc. in Dennis, Mass. But Project Eagle at least makes IBM's products easier to buy and install, she added.

Until now, the job of integrating the client/server versions of IBM products such as CICS and DB2 had fallen squarely on customers' shoulders. "That can be a real challenge," said Ed Wehner, manager of business information systems at MEMC Electronic Materials, Inc. in St. Peter's, Mo.

"You buy one piece from here and one piece from there, and there are a lot of places where things can fall apart," Wehner said. Different IBM units were also quick to blame one another, he added.

1995

AUGUST
Announces plan for using common hardware components in different IBM systems

DECEMBER
Mainframe shipments reach record level after declining the previous two years

JANUARY
IBM Software Group formed; U.S. and overseas sales organizations combined

FEBRUARY
IBM pulls back on marketing Windows NT versions of its software to avoid hurting OS/2

JUNE
IBM signs deal to buy Lotus Development for $3.5 billion; second generation of CMOS-based mainframes introduced

SEPTEMBER
Concedes desktop operating system fight and focuses on OS/2 enterprise customers

OCTOBER
Jim Manzi resigns as head of Lotus; plans for OS/390 operating system announced

NOVEMBER
IBM reverses field and puts Windows NT on same priority level as OS/2 and Unix for software releases

DECEMBER
Forms Internet division; mainframe shipments set record, up 60% from previous year

1996

FEBRUARY
IBM signs deal to buy Tivoli Systems for $750 million

to IBM for any solutions."

IBM has received similar responses from other customers who couldn't wait for the firm to deliver competitive products and turned to other vendors instead.

Edward D. Jones & Co. stores all 3T bytes of its mainframe data on EMC Corp. disk arrays and still considers IBM as "trailing in that market," said CIO Rich Malone. Likewise, the St. Louis brokerage turned to Sun and Oracle Corp. for a client/server system that it is rolling out at its headquarters and 3,200 branch offices.

"Back when we first did the architectural work, IBM wasn't strong in client/server," Malone said. "If I was starting now, they might be a player. But I already made my decisions."

One of the key businesses in which IBM has long fallen short is client/server software. Gerstner has made changing that a top priority, as evidenced by his acquisitions of Lotus and Tivoli Systems, Inc. He also put developing for Microsoft Corp.'s Windows NT on par with IBM's OS/2 and AIX operating systems.

The grudging embrace of NT showed that IBM "has started to become more pragmatic," said Judith Hurwitz, president of Hurwitz Consulting Group, Inc. in Newton, Mass. But IBM still needs better marketing and channel support for its software, she added.

For all its attempts, IBM still falls a distant second to Microsoft in its perception as a technology innovator, according to the *Computerworld* survey (see chart). Microsoft also is seen as the biggest threat to IBM because of its hegemony on the desktop and the potential of Windows NT to grab a big chunk of the server market.

"Microsoft is the IBM of 20 years ago," said Bob Barone, vice president of information technology at Broadcast Music, Inc. in New York. "We've always been IBM bigots. [But] now, with this more PC-based type of environment, I just haven't seen them take the lead."

Service, support suffer

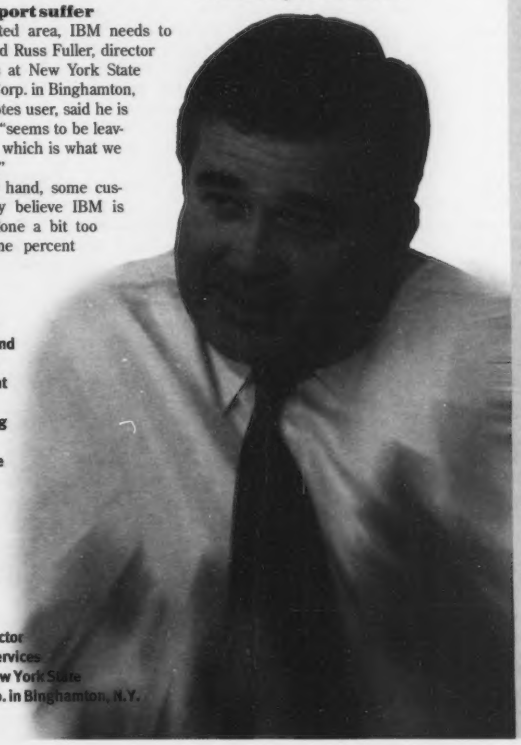
"In the distributed area, IBM needs to catch up," agreed Russ Fuller, director of IS operations at New York State Electric & Gas Corp. in Binghamton, N.Y. Fuller, a Notes user, said he is happy that IBM "seems to be leaving Lotus alone, which is what we hoped they'd do."

On the other hand, some customers say they believe IBM is leaving them alone a bit too much. Thirty-one percent of the survey respondents said IBM's service and support have gotten worse during the past three years, when IBM cut its field staff and increased fees.

Most users said there are fewer IBM sales representatives and service engineers to go around. But several users said the lack of bodies has been offset by a reduction in IBM's bureaucratic bloat, which allows for quicker decisions.

"IBM is more proactive and can move much faster," said the University of Miami's Temares, who recently negotiated an Internet access deal with IBM in less than a month. The school earlier had settled on a long-distance carrier, "but they just didn't move fast enough."

Gerstner "certainly gave [IBM] a good wake-up call," added Sam Albert, a consultant in Scarsdale, N.Y. "Now comes the real challenge of producing new revenue streams to replace the old IBM."



Gerstner hasn't been afraid to send members of the IBM management team packing, much to the liking of some users. "He's done some things with senior executives that [sent the message], 'Hey, put up or shut up.' That's produced results," said Russ Fuller, director of information services operations at New York State Electric & Gas Co. in Binghamton, N.Y.

STEVE BORNS

finally!

IBM also is adopting a single pricing format across all of its servers. Included will be a switch to concurrent user licensing, which was prompted by customers complaining that straight per-seat pricing became too expensive as installations grew in size.

Although customer letters detailing the Project Eagle servers have already been posted on IBM's World Wide Web page, pricing remains a closely guarded secret. Sources at IBM said they will cost less than the sum of their parts, but analysts noted that customers don't always need all the pieces that come with the servers.

OS/2 and AIX versions of the Project Eagle servers are already available or will ship in early May. IBM is initially announcing Windows NT support only on Notes and its database and Internet connection servers. The other four will get NT support late this year or early next year, officials said.

Bitten by the 'net bug

IBM has caught the Internet/intranet bug big-time, but the company is still playing catch-up to competitors such as Sun.

IBM's new mantra is "network-centric computing." And Chairman Louis V. Gerstner predicts the coming Internet era will be tailor-made for IBM's large systems.

"Everything about the Internet and intranets plays to [our] strengths," he said during a speech to financial analysts in New York this month.

IBM set up a new Internet division last December, and the company is building World Wide Web hooks into all of its servers plus key software products such as CICS and DB2. Meanwhile, its global network unit plans to take on AT&T Corp. and MCI Communications Corp. in the Internet access business.

The Internet "is nothing short of an obsession within IBM," said David Andrews, a consultant in Cheshire, Conn. "Everyone has quickly figured out that the way to get discretionary funds [for a project] is to show that what you're doing ties in with network-centric computing."

Some users say Gerstner's optimism rings true. As customers move to a more network-based approach to computing, "people are going to find that they do need a lot of muscle and security" at the server level, said Carl Gerberich, vice president of information services at Marist College in Poughkeepsie, N.Y.

But others said that even if the Internet/intranet wave does portend good things for server vendors, IBM won't necessarily be the big beneficiary.

"That's a nice wishful thought, but any hardware man can jump up and say that," said Eric Singleton, director of information systems at AlliedSignal Technical Services Corp. in Columbia, Md.

Sun and other vendors have been preaching the gospel of network-oriented computing for a lot longer, putting IBM in catch-up mode, said Rich Malone, chief information officer at Edward D. Jones & Co., a brokerage in St. Louis.

— *Craig Stedman*

OMG picks OpenDoc, puts users in quandary

By Frank Hayes

How will corporate desktops connect to an object-oriented enterprise backbone? The answer to that question got murkier last week as the Object Management Group consortium of vendors and users selected OpenDoc as its preferred way of linking desktop applications with enterprise object middleware.

OMG
OBJECT MANAGEMENT GROUP

OpenDoc, a system for assembling software components into applications, is being developed by IBM and Apple Computer, Inc. for the Windows, OS/2, AIX and Mac OS operating systems.

But most corporate information systems shops already have a standard for connecting software components: Microsoft Corp.'s OLE, which is built in to Windows.

The OMG's choice of OpenDoc puts some users in a bind. "I like the technology of OpenDoc, but the de facto tool that is commonly used on the desktop is OLE," said Hide Horiuchi, architecture planning manager at AT&T Corp.'s Wireless Services division in Kirkland, Wash.

During the past two years, large enterprises have used OMG's Common Object Request Broker Architecture (CORBA) as a standard for building object-oriented enterprise networks. Most users expected to use Windows-based OLE on the desktop and CORBA for higher-level services at the network level, said Tom Hein, manager of technology integration at Deere and Co., a heavy-equipment maker in Moline, Ill.

OMG in Framingham, Mass., is working on a standard way to link OLE to CORBA-based networks. But Microsoft has been dragging its feet in providing some of the technical information needed to create that specification [CW, Feb. 12].

In the meantime, the linking of OpenDoc with CORBA will give users an alternative approach for linking OLE components and applications with CORBA networks.

OpenDoc will be modified so that applications developed with it can be linked to CORBA networks. OLE components can be used in OpenDoc applications, said Steve Mills, general manager at IBM's Software Solutions division. The resulting applications also will be able to interoperate with CORBA applications and services on operating systems that don't support OpenDoc.

Are objects right for everyone? See page 101.

OLAP integration

BusinessObjects ties in query, reporting features

By Juan Carlos Perez

A new database tool from Business Objects, Inc. combines on-line analytical processing (OLAP) with query and reporting features.

With BusinessObjects 3.1, users had to switch to an OLAP application to analyze data multidimensionally.

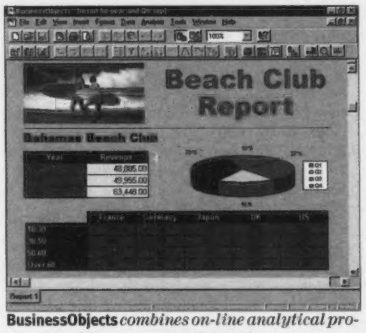
Only then could they rotate and slice data to extract more information.

Good mix

What sets BusinessObjects 4.0 apart is its combination of query and analysis with the product's metadata feature, which was designed to shield end users from the complexity of relational databases, said Richard Finkelstein, president of Performance Computing, Inc., a consultancy in Chicago. This combination improves the product, but it isn't an earth-shattering breakthrough, Finkelstein said.

"Integrating OLAP with traditional query and reporting is important because users need both tools to get a complete business picture," said Teresa Wingfield, a senior industry analyst at Giga Information Group, Inc. in Cambridge, Mass. Users don't want to switch between a query and an OLAP application, she said.

Beta tester James Rischar, a systems analyst at Eli Lilly and Co.'s manufacturing division in Indianapolis, said the software offers added flexibility.



BusinessObjects *combines on-line analytical processing with query, reporting tools*

And the interface — with wizards and drag-and-drop capabilities — makes it easier to configure the tool, Rischar said.

End users will find the new version easier to use and more powerful, thanks to the OLAP feature, he added. He said he plans to expand his user base of 10 chemical engineers and microbiologists to about 20 with this new release.

Robert Moran, director of decision support research at Aberdeen Group, Inc. in Boston, said adding multidimensional analysis to BusinessObjects is "a significant improvement, a fine evolutionary step, that makes this product an enterprise tool."

Wingfield said she would like the product to let a user transfer processing from a client machine to a server in real time.

BusinessObjects 4.0 lets users schedule the automatic generation of reports in advance, according to the Cupertino, Calif.-based company.

Pricing per client is $595 for the query and reporting module, $695 for the OLAP module and $150 for the module that allows schedule processing. The designer module for configuring the tool and the optional supervisor module for security features each cost $1,995.

Intranets

CONTINUED FROM PAGE 1

ment about its commitment to the Internet. "The key is to have real products to show. Sun can't rest on the laurels of Java," said Sylvia Clark, a senior analyst at Aberdeen Group, Inc. in Boston.

What lies ahead

Sources said the company's SunSoft division will try to build on Java's burgeoning popularity by introducing the following products:

- Solaris Internet Server will officially be unveiled at Networld/Interop '96 next week in Las Vegas, but Sun executives will preview the software tomorrow at press conferences in New York and San Francisco.

The Internet server was designed to deploy Web sites and groupware business applications on corporate networks and the Internet. It costs $1,295 and runs on Solaris. It includes Hypertext Transport Protocol Web server software and full Domain Name System support.

- Java Objects Everywhere (JOE) is Java-based software that links Java applications with enterprise networks based on the Common Object Request Broker Architecture (CORBA) middleware standard. Available immediately as a free download, JOE initially supports Network Enterprise Objects (NEO), Sun's version of CORBA [CW, March 4].
- Java WorkShop 1.0 is a set of cross-platform Java development tools, due in May, that lets users create Java applications or integrate Java applets with Web sites. The product costs $295 and includes a Web browser, source editor, compiler, debugger and project manager. It supports Solaris and Microsoft's Windows 95 and Windows NT.
- Internet Workshop 1.0 is a bundled development environment that can be used to create enterprisewide client/server applications based on Java. Internet Workshop 1.0 packages Java WorkShop along with the JOE and NEO products.
- Solstice Mail Server and Client provides direct Internet mail access without the need for an Internet gateway. It supports the Internet Messaging Access Protocol, which ensures that mail can be sent between disparate mail systems without having to be converted. The client portion gives remote users the ability to view message headers and decide which messages to download.

As reported already, Sun is introducing Netra Internet Server 3.0, which is based on its 64-bit UltraSPARC microprocessor. The hardware is aimed at corporate customers.

Finally, the company is creating Sun Internet Practice, a consulting group that will offer development, design and management services.

Sun's rays

Sun's Internet/intranet strategy faces stiff competition

Sun Microsystems	The competition
Netra Internet Server 3.0	**Silicon Graphics'** Web Force **Hewlett-Packard's** Web Server 9000 **Digital's** Internet AlphaServer
JOE (Java Objects Everywhere)	**Microsoft's** Active X
Java WorkShop 1.0	**Borland's** Latte **Natural Intelligence's** Roaster **Symantec's** Cafe Various C++ development tools
Internet Workshop*	**Microsoft's** Active X and VB Script
Solstice Mail Server/Client	**Netscape's** Mail Server **NCD's** post.office
Solaris Internet Server	**Microsoft** **IBM** **HP** **Digital** **Silicon Graphics**

*No Java-based competitors

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When you're the largest independent retailer of gasoline in the U.S., with over 2500 stores and annual sales topping $3.5 billion, one small change in fuel prices can have a big impact on the bottom line. That's why Circle K Corporation's Petroleum Products and Services Division turns to the SAS System.

"Its analytical capabilities, ease of use, and ability to handle large amounts of data put it above and beyond other software," says Mary Niles, Petroleum Systems Analyst for the division.

Fitting Circle K's Information Needs to the Letter

Circle K's business analysts say SAS software has meant tremendous time savings in day-to-day business tasks. According to Dianne Hurley, Director of Petroleum Pricing and Ordering for the division, "SAS software lets us forge forward with our data, enabling us to create pricing models, volume predictors, and budgets in record time. This, in turn, lets us make decisions much more quickly."

Data regarding gasoline pricing is gathered into GMARD—short for Gasoline Marketing Analysis Relational Database—a system built with SAS software. From there, the data is transformed into meaningful business information for executives throughout the Petroleum Products and Services Division. Niles says, "The software lets us easily add other applications and functionality." Now in development is a SAS-based EIS for non-technical executives. "It's a big goal of ours to provide executive information systems that allow people at the top to quickly and easily view data and make good business decisions. To them, a picture is worth a thousand words," adds Hurley.

Dianne Hurley and Mary Niles of the Circle K Corporation.

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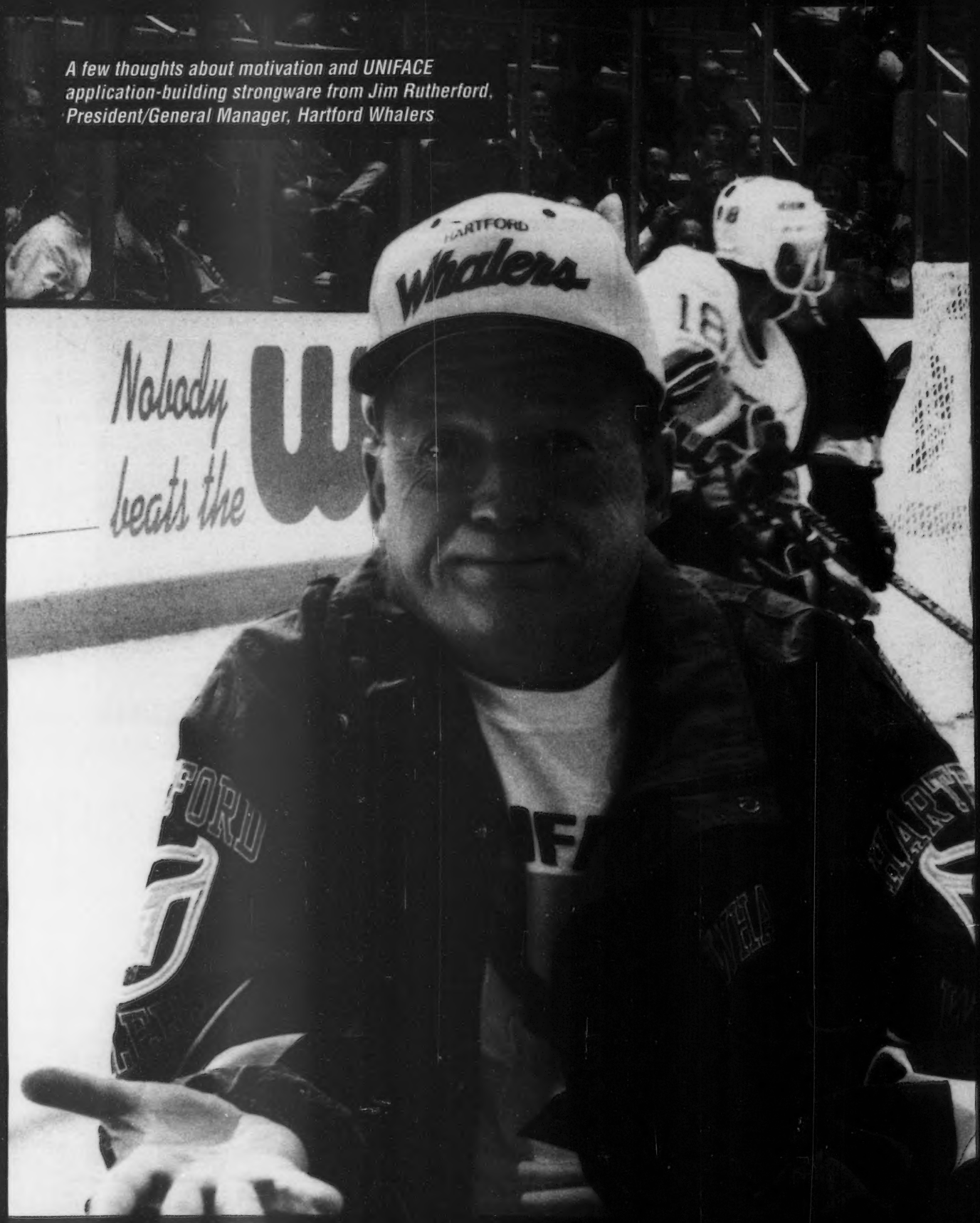
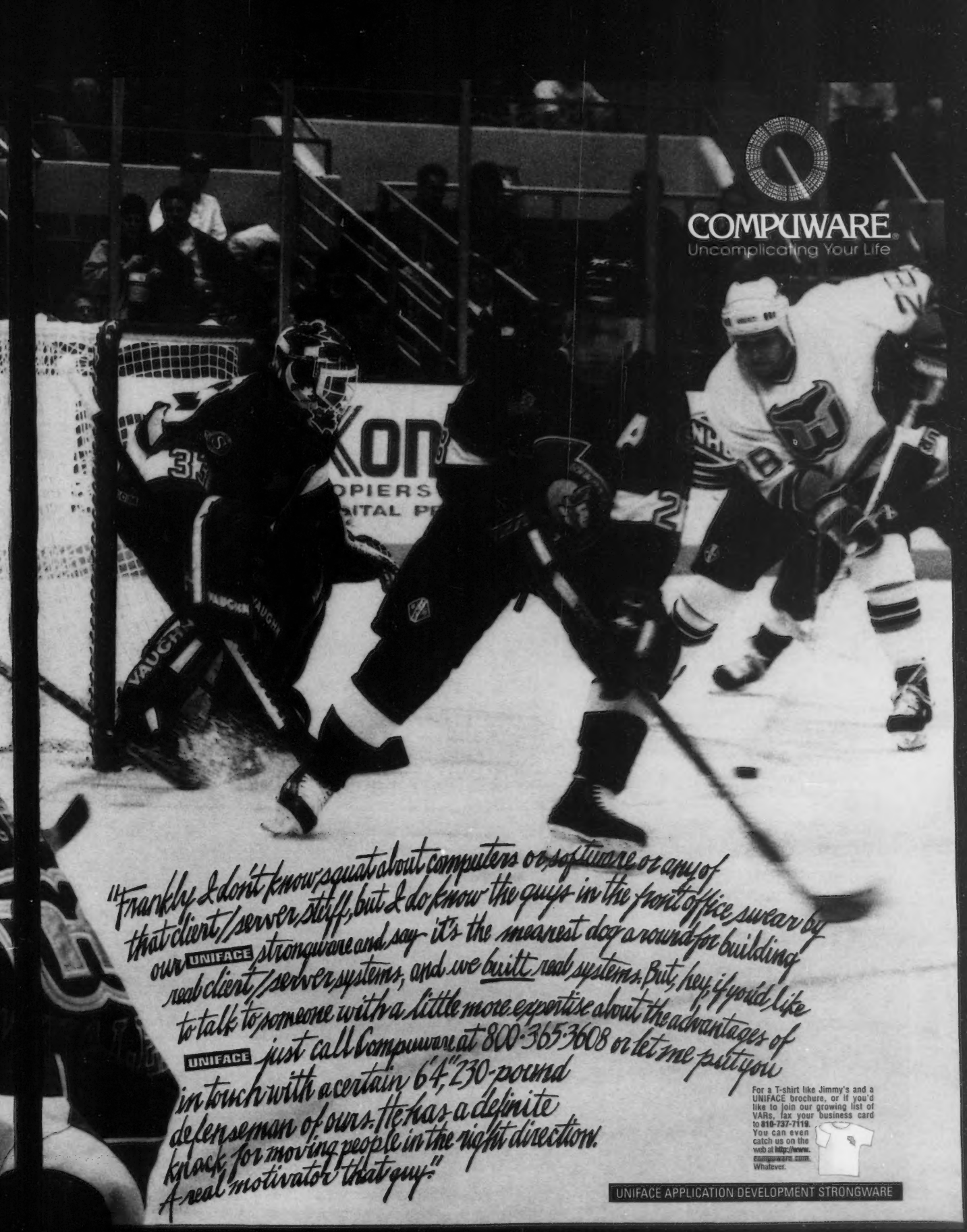
A few thoughts about motivation and UNIFACE application-building strongware from Jim Rutherford, President/General Manager, Hartford Whalers

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UNIFACE APPLICATION DEVELOPMENT STRONGWARE

Products span ATM, legacy net gap

By Bob Wallace

LAN switching power Madge Networks, Inc. and ATM market leader Fore Systems, Inc. last week announced switches that bridge the gap between today's networks and emerging Asynchronous Transfer Mode (ATM) networks.

Madge rolled out two switches: One offers Token Ring-to-ATM access and a second offers Ethernet-to-ATM access. Fore detailed ATM wide-area network access products that let users move to wide-area ATM links.

ATM is a next-generation switching technology that processes voice, data and video traffic together and does it faster and more efficiently than today's widely used switches. The much-ballyhooed technology has struggled to catch fire for several years.

"Making the move to ATM has been like jumping the Snake River Canyon because there's been virtually no [switching] products that make the process a gradual migration," said Daniel Briere, president of TeleChoice, Inc., a Verona, N.J., consultancy.

"We think Madge's product plan makes the move toward ATM much more smooth," said Sam Hall, technical planning analyst at Utilicorp United, Inc. in Kansas City, Mo. The company is moving to Ethernet switching with an eye toward ATM.

Madge's new Collage 530 Ethernet-ATM Access Switch is a stand-alone unit with 16 switched Ethernet ports and a 155M bit/sec. ATM port. The unit costs roughly $555 per switched Ethernet port.

While that is a few hundred dollars per port higher than some low-priced Ethernet switches, the lower-priced switches don't offer ATM access.

The Collage 540 Token Ring ATM Access Switch comes with 10 switched 4M and 16M bit/sec. Token Ring ports and a 155M bit/sec. ATM port. It will cost $1,500 per port. Some stand-alone Token Ring switches cost less but don't offer ATM access. Newbridge Networks, Inc. will resell this box. Both products will ship in April.

Madge also announced the LANswitch LSA Access Switch. Priced at $11,995, the switch module gives Lannet LAN switches access to ATM networks. Madge bought switching hub player Lannet, Inc. last year and will ship LANswitch in June.

"We are going with the Lannet box because it offers better port density," Hall said.

Fore also announced the CellPath line, which makes ATM more cost-justifiable by aggregating voice, video and data traffic at various-size sites onto one or more wide-area ATM links without costly ATM switches.

There are many devices on the market that perform the same functions for wide-area frame-relay links, which run up to 1.544M bit/sec. ATM access gear handles higher speeds and offers more advanced features.

Pricing for the low-end CellPath 90 starts at $5,495. Pricing for the midrange CellPath 200 and the high-end 300 starts at $20,000. CellPath 90 and 300 are expected to ship this summer.

Jefferson Airplane

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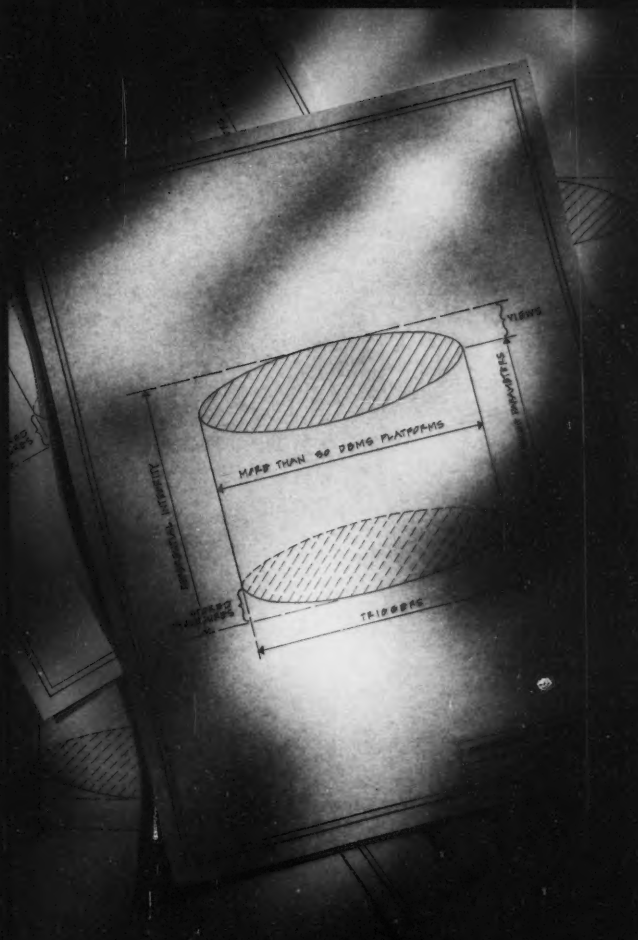

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Feel 'help'less? You're not alone.

By Julia King

Companies spend millions of dollars on information systems, then dump problems on underfunded and already overburdened help desks.

That was one of the more common gripes at a recent Help Desk Institute and Support Services Conference in Reno, Nev.

Frontier Corp., a telecommunications company in Rochester, N.Y., is "putting in $6 million to $10 million in new [IS] assets every year." Yet after six months, neither managers nor help desk staffers know precisely where they are, said Ron Fovargue, customer support manager.

But that hasn't stopped users from calling Fovargue's support organization with hardware and software problems. Frontier's two help desks receive more than 13,000 calls a month from 7,500 users.

Meanwhile, some other IS-intensive companies are just now getting around to establishing a help desk.

Until about six weeks ago, workers at Community Newspaper, Inc.'s 140 daily and weekly newspapers in Massachusetts had no one to call with systems problems. Now that they do, the new, two-person help desk is getting about 600 calls a week.

"And we haven't even officially announced it yet," said Carole Sullivan, manager of training and support at the Needham, Mass.-based newspaper chain.

A lack of adequate funding is the major reason for the support gap. Help-desk budgets simply aren't keeping pace with increasingly complex technology rollouts, managers said.

At the same time, the trend is toward help desks taking on even greater and more diversified responsibilities.

Spring reading list

The following books sold briskly at the recent help desk conference:

The Heart Aroused: Poetry and the Preservation of the Soul in Corporate America by David Whyte

TechnoCrazed: The Businessperson's Guide to Controlling Technology Before It Controls You by Michael Finley

Getting Things Done When You Are Not in Charge by Geoffrey Bellman

A Complaint Is a Gift: Using Customer Feedback as a Strategic Tool by Janelle Barlow and Claus Moller

"The help desk is typically the trashing ground of IS. The problems get dumped there, but no resources get dumped there to deal with them," one frustrated manager said.

Research indicates that a company's return on investment in help desk technology can be substantial and accrue over a relatively short period of time. The return on investment in systems management tools can cut user downtime by as much as 75% in one to six months, according to International Data Corp. in Framingham, Mass.

Outsourcing is one way companies are beginning to deal with the problem.

Taco Bell Corp. in Irvine, Calif., partially outsourced its help desk for store operations to Coopers & Lybrand in 1993. In the last two years, call volume went up by 82%, but wait times decreased from an average of 6½ minutes to 64 seconds.

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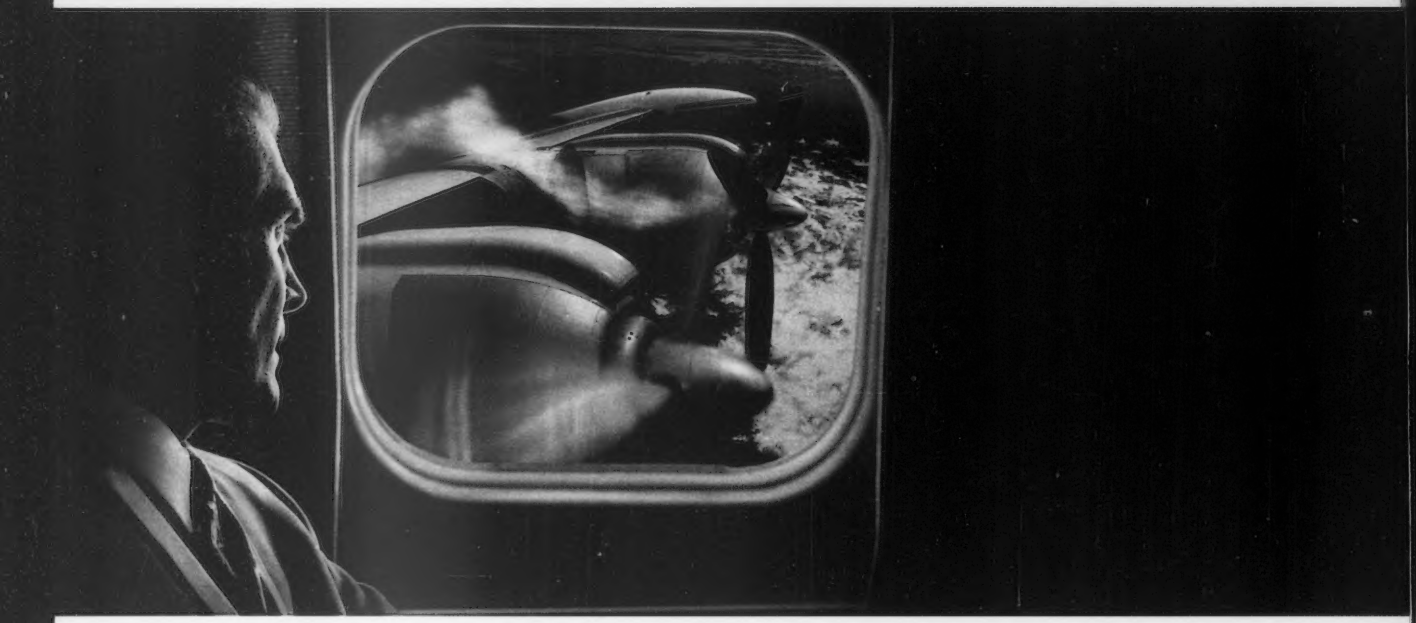

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Checking the IS/corporate alignment

Survey cites challenges IS execs face

By Thomas Hoffman

Which of the top information systems issues keep you awake at night?

Aligning technology with corporate goals? How about instituting cross-functional systems? Those were among the key challenges cited by the 346 North American IS executives who participated in Computer Science Corp.'s annual "Critical Issues of I/S Management" survey. The results of the poll were released last week by Computer Science in El Segundo, Calif.

Some IS chiefs struggle with nontraditional problems. Jules D. Cohn's catchphrase du jour is "Chapter 11."

As the vice president of IS at Barney's New York, Cohn has had to put several high-flying projects on hold since the upscale New York clothier entered bankruptcy proceedings in January.

For example, Barney's was preparing to roll out a frame-relay network this month that would have given managers at its Manhasset, N.Y., outlet almost instant access to customer and merchandise data from its mainframe in Lyndhurst, N.J. The frame-relay network "would really give us a competitive edge," Cohn said.

Meanwhile, other IS executives wrestle with technology and business alignment. That's a top priority at Avon Products, Inc. in Rye, N.Y., as the cosmetics maker continues to expand globally.

Most countries besides the U.S. are behind the technology curve, but "there's a great opportunity for us to do architectural leapfrogging," said Spencer McIlmurray, vice president of information technology services at Avon. The cosmetics maker can, for example, jump from copper wire-based communications to cellular or satellite connections, he said.

Mapping IS with corporate requirements continues to be a challenge for Don LaFerla, vice president of MIS at Leggett & Platt, Inc. in Carthage, Mo., a furniture and bedding components maker. LaFerla and his staff in the past year have had to consolidate systems from 10 Leggett & Platt acquisitions and move forward with other technology projects, all with a relatively flat IS budget.

Steven Boxes

Jules D. Cohn *of Barney's New York has postponed IS projects in order to deal with the company's Chapter 11 woes*

X terminal embarks on new frontier

By Craig Stedman

That cutting-edge Internet appliance coming soon to your desktop may look suspiciously like a boring old X terminal.

To avoid being crushed by the stampede toward low-cost network access devices, some X terminal vendors are rushing to embrace the concept themselves.

Recast X terminals, which are expected to cost about $1,000, will start to appear shortly. They will have color monitors and will be able to run Java applets and World Wide Web browsers.

Announcements

HDS Network Systems, Inc. in King of Prussia, Pa., recently released a prototype implementation of Sun Microsystems, Inc.'s Java engine for its line of X terminals. That is a prelude to a planned second-quarter release of a full-fledged Internet device with Java and Spyglass, Inc.'s Web browser.

SunRiver Corp. in Austin, Texas, also will ship on a limited basis a Java-based adaptation of its low-end X terminal in the second quarter.

Network Computing Devices, Inc. in Mountain View, Calif., expects to add Java support during the second half of this year, and Tektronix, Inc. said it is doing feasibility work with Java and browsers in its labs.

Traditionally, X terminals were display stations that relied on host Unix servers to handle processing chores.

But they sport RISC microprocessors that should be able to run Java or browser applications. They also offer wider application support than Internet appliances, said several users and analysts. Pricing for the Internet appliances is supposed to start at about $500 without a monitor, they said.

An X terminal can access applications that run on Unix and Microsoft Corp.'s Windows NT servers as well as mainframes and minicomputers. But some terminal vendors said adding that functionality could drive the price beyond $1,000.

Renovated X terminals may cost more than network appliance rivals, "but their capabilities are in some respects higher," said Eileen O'Brien, an analyst at International Data Corp. in Framingham, Mass.

Tom Schlagel, a computer analyst who provides technical support for X terminals at Brookhaven National Laboratory in Upton, N.Y., said running Java applets on the machines could reduce server and network strain and still allow central administration and control. "It would essentially free you from the host [but] you'd be pulling all your applications over the network," Schlagel said.

Because the applets would reside at servers and be downloaded only for execution, X terminals shouldn't lose the ease of administration that sets them apart from PCs and workstations, he added.

Multiple choice

A comparison of clients for accessing the Internet and corporate intranets

	Pros	Cons
Network appliances Expected cost: $500 to $1,000	■ Low cost and ease of use ■ Centralized control and administration	■ Only for on-line use ■ $500 price may not include monitor
Revamped X terminals Expected cost: $1,000 and up	■ Centralized control and administration ■ Can access Unix, Windows and mainframe applications	■ Limited expandability on low-end models ■ No local disk storage
Pentium PCs Current cost: $1,200 and up	■ Maximum local functionality for end users ■ Reduces workload at host servers	■ Requires complete support and administration ■ Users retain control, not IS

DEC points finger at sagging PC sales

Comeback efforts hit a speed bump

By Jaikumar Vijayan

Digital Equipment Corp. is the latest vendor to blame flagging corporate sales on weaker-than-anticipated PC revenue.

Earlier this month, desktop market leader Compaq Computer Corp. warned investors of a similar slowdown in sales. And last week, chip maker Cirrus Logic, Inc. announced layoffs of more than 400 employees due to decreased demand for its chips (see story, page 32).

The announcements renewed fears of a deepening slowdown in the corporate marketplace that could spread to other PC vendors but also create big-time price cuts for users.

Prices slashed

For instance, Compaq, Digital Equipment Corp. and IBM have already dropped PC prices by up to 27% this month. And those vendors say they are willing to make more cuts to push sales.

But the latest moves are of little consequence to companies inured to the incessant price cuts [CW, March 11].

"The way things are going for us right now, we can't wait for potential price cuts. When you need a system, you buy it," said Gary Davis, president of Animation House, Inc. in Evansville, Ind. Davis is a heavy Digital user who is in the market for Digital PCs.

Digital's announcement that PC revenue will be lower than anticipated comes less than a month after the company's decision to pull out of the high-volume consumer PC market.

With PCs accounting for 17% of the company's total revenue, the slowdown is seen as a setback for Digital's overall turnaround effort.

But Bruce Claflin, who recently left IBM to head Digital's PC business, denied that the company is dipping into the red.

"It is disappointing, but no one should interpret this as Digital is slowing or that we are losing money," he said.

Waiting for upswing

Terry Shannon, editor of "Shannon Knows DEC," a newsletter in Ashland, Mass., said the PC problems aren't enough to derail the company's comeback.

Shannon noted that all other parts of the business "seem to be intact."

In response to the sales slowdown, Digital has cut shipments to the reseller channel and initiated several cost-cutting measures that won't include layoffs, at least for now, Claflin said.

Digital will introduce a richer mix of Windows NT products into its PC lineup later this year, Claflin said.

Despite the current slowdown in sales, some observers say they think corporate demand will pick up in the second half of the year as corporations finally decide between migrating to Microsoft Corp.'s Windows NT or Windows 95.

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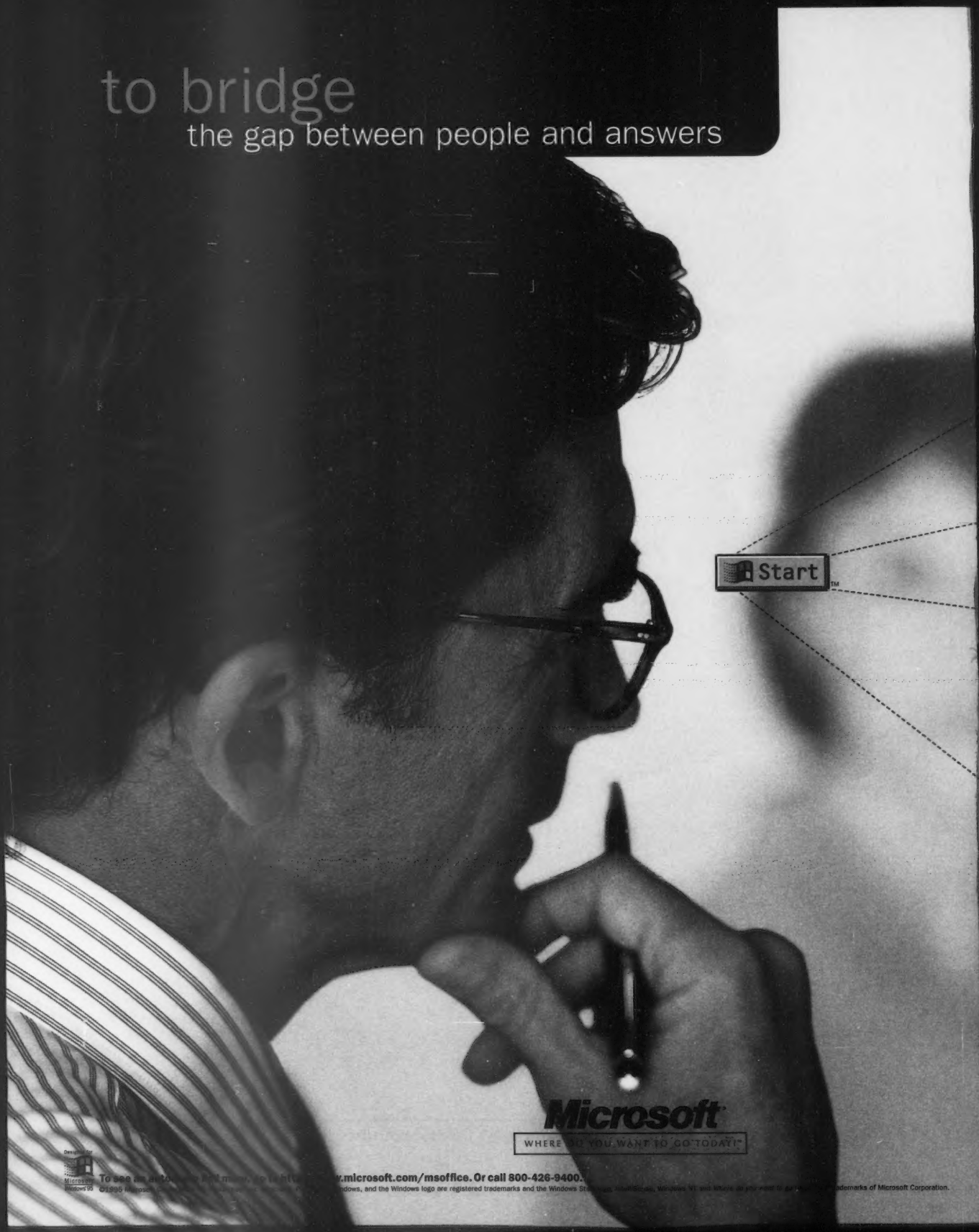
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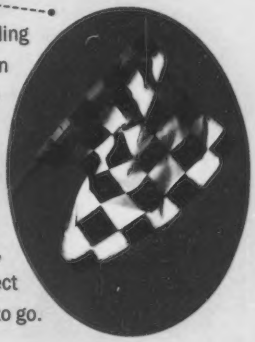

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Computer Industry

Clinton ups R&D budget

But knife-wielding Republicans may seek cutbacks

By Gary H. Anthes
WASHINGTON

Swimming upstream against a tight-fisted and sometimes techno-phobic Congress, President Clinton last week unveiled a budget designed to increase federal spending on research and development for the fourth consecutive year.

Overall spending on R&D in fiscal 1997 would rise just 2% under the president's plan, but some programs were earmarked for a big boost in bucks. For example, Clinton would give $45 million, or 15% more, to the U.S. Department of Commerce's controversial Advanced Technology Program, which Republicans have threatened to kill entirely.

The Advanced Technology Program gives matching grants to companies and universities to pursue risky basic research. It has been branded by some as wasteful corporate welfare.

"A budget must honor our obligation to push back scientific frontiers and crash through technological barriers," said Vice President Al Gore at a press conference. "The president's budget does. It continues our investments in the Advanced Technology Program, manufacturing extension and the National Information Infrastructure."

In that vein, the Clinton budget earmarks $742 million for the troubled $4.5 billion project to modernize weather forecasting systems, a whopping $138 million more than is being spent this fiscal year. A report last month by the Commerce Department's inspector general found that a key component of the overhaul was $175 million, or 50%, over budget and four years behind schedule.

Funding a 'fiasco'

The budget would also boost funding for the Internal Revenue Service's mammoth but troubled tax systems modernization program to $850 million, $85 million more than this year's budget. Two weeks ago, in a scathing indictment of the "$4 billion fiasco," Rep. Jim Lightfoot (R-Iowa), chairman of an IRS oversight committee, said he would cancel the project next year unless the IRS can convince him within two months that it's on the right track.

Republicans weren't impressed with Clinton's proposed spending on technology, especially for the Advanced Technology Program. House Science Committee Chairman Robert S. Walker (R-Pa.) called the budget "a blow to basic research and development and a boon to industrial policy masquerading as science."

White House budget proposal

Vice President Gore said the budget will "crash through technological barriers"

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NASA	$9.3B	$9.4B
Energy	$6.7B	$6.3B
National Science Foundation	$2.4B	$2.5B
Commerce	$1.1B	$1.3B
Environmental Protection	$508M	$585M
Other	$3.9B	$4.5B
TOTAL	$71.4B	$72.7B

*Proposed

Source: White House Office of Management and Budget, Washington

Another item sure to tempt the Republican budget knife is a new program in the U.S. Department of Defense that would establish government/industry partnerships to develop technology that can be used in military and commercial applications. Clinton asked for funding of $250 million, $55 million more than will be spent this year on such so-called dual-use technology.

A recent analysis of Republican budget proposals by the American Association for the Advancement of Science showed that Republicans would cut funding for science and technology by 30% by 2002.

Palmisano brings track record to IBM PC Co.

By Bob Francis

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Palmisano, 44, doesn't have PC experience. He hails from IBM's Integrated Systems Solutions Corp. (ISSC), the company's consulting and outsourcing group.

But he does have a proven track record at IBM, according to consultant Sam Albert, president of Sam Albert Associates in Scarsdale, N.Y. "He's a trusted performer, and at ISSC he helped turn IBM from a company that just sold machines into a service company. That's quite an accomplishment," Albert said.

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Palmisano replaces Richard Thoman, who is now IBM's chief financial officer. Thoman joined IBM in 1994; he was charged with reversing the PC group's fortunes.

Until last year, IBM had faltered badly in the PC business. It overestimated demand in 1993, then overcompensated the next year. This led to huge losses. The group lost market share, and precious corporate accounts, to Compaq, which supplanted IBM as the world's largest PC manufacturer in 1994.

But the IBM PC Co. returned to profitability last year, and IBM officials said strong PC and server sales contributed to good fourth-quarter results.

How would you rate IBM's standing in the following areas?

COMPUTERWORLD User Pulse EXCLUSIVE SURVEY

PC slowdown prompts cuts at chip maker

By Melissa Bane

Chip maker Cirrus Logic, Inc. last week announced plans to lay off about 400, or 13%, of its workers and refocus its product line on video graphics cards, modems and digital cordless chip sets.

The company said it ran into trouble because it overestimated the demand for PC chips and hired too many people. Cirrus added that it expects to post a loss in its fourth fiscal quarter, which ends March 31.

But analysts said the problem is specific to the Fremont, Calif.-based Cirrus and not a warning of bad times ahead for the industry as a whole. "I think more than any weakness in the PC market, Cirrus has more graphics market competition," said Sherry Garber, vice president of Semico Research Corp. in Phoenix. "I don't think their trouble should be taken as a sign that everyone else in the industry will have the same problems."

Tim Sloane, an analyst at Aberdeen Group, Inc. in Boston, agreed. "Cirrus has made it through previous industry slumps without these problems, so this is indicative of a larger problem in the company," he said.

The decision to focus on newer technologies is a smart move for Cirrus, Sloane added. "There is a lot happening in the graphics industry, and Cirrus needs to move upscale faster into 3-D and video to add sales," he said.

He said Cirrus' problems may also be tied to a slump in the upgrade market caused by more people buying new systems. "Cirrus had a good business in the upgrades," Sloane said.

Sloane added that as new CPUs incorporate more and more video logic, the middle market for graphics chips is shrinking. "All of those companies that are looking at making a market out of the graphics add-on boards are going to have to focus on the high end because the middle market will get eaten by the CPU manufacturers," Sloane said.

But Garber said the company should pull through this dry spell. "I think Cirrus has good products; they just overbuilt," she said.

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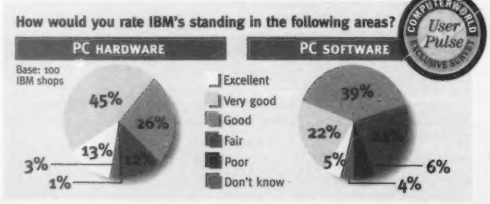

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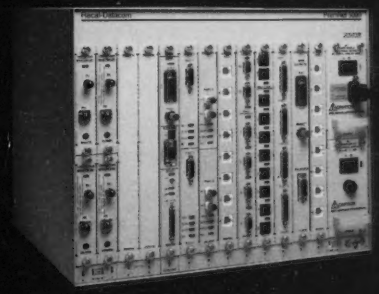

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Editorial

Chicken Little redux

The city of Phoenix first realized it had a problem on Jan. 2, 1995. A simple application that calculates five-year payments crashed inexplicably. The problem? When the program tried to subtract 95 from 00 in the two-digit date record used in the data files, it simply bit the dust.

Jack Thomas, the city's deputy information systems director, is philosophical. "It's a good thing it crashed," he says. Had it not, the city would not have discovered that the application was flawed. "Then we could have begun calculating inaccurate payment schedules with potentially disastrous results."

It will cost Phoenix an estimated $3 million to fix the year 2000 problem across 14 major applications that support several of the city's major departments. An analysis by nearby Viasoft, which the city hired to consult on the job, found that more than 90% of the IS department's programs use date routines that were potentially vulnerable. Will the city swallow the cost? Thomas sighs. "We have no choice," he says.

Do you?

The year 2000 program problem could turn out to be the biggest nonevent since the Michelangelo virus, but I wouldn't bet on that. Gartner Group has said the problem will cost U.S. business more than $200 billion over the next four years. Others say don't worry: Routine upgrades and maintenance will fix the bugs in plenty of time.

Users who have been through the mill say it's not as simple as expanding all your date fields to four digits. First you have to find them, scattered across perhaps thousands of programs.

Even if you fix the programs, you still have to filter all your data records, maybe a few million of them. And what about records stored off-site?

On page 4 of last week's issue, we reported on three cases in which the extra day in February this year threw programs for a loop. I shudder to think of when that day becomes 100 years. The city of Phoenix is biting the bullet and fixing the problem before it becomes a problem. On page 83, you can read about how The Equitable is doing the same thing. I think these organizations are smart. Better to wrestle with the beast today than wait until your company's future is at stake.

Paul Gillin, *Editor*
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Letters to the editor

IS could use chaos

I was pleased to note your short article on the use of research on chaos and complexity as an aid to solving business problems ["Fight chaos with chaos," CW, March 4].

Corporate IS would be well-advised to become acquainted with this subject to gain some understanding of the computing environments we support.

For instance, our "legacy" applications were developed years ago and perhaps were at the limits of human capacity for designing complexity. Since then, changes to programs, data, application interdependency and supporting software have created systems of such complexity that they cannot be migrated or replaced.

Within the studies of complexity, complex adaptive systems, evolutionary mechanics and the like, we might find directions to take relative to the legacy software.

Michael MacDonald
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Narrow the study

A college degree says to the world that you have the ability to learn, yet according to "IS schools need improvement" [CW, Feb. 19], many employers would like to have a "Plug and Play" college graduate.

Much of the general education in the first years of college can be given in high school. Colleges should be a place for four or five years of intense study in your particular area.

A college structured this way could be a partner to local businesses, offering students for four-year internships.

Upon graduation, the business would probably want to hire the individual. But if it does not, at least the student has four years of marketable experience.

Ryder Gibson
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Foreign solution

There has been a lot of talk about replacing American programmers with foreign programmers ["Look out, here comes India," CW, Feb. 26].

But the reality is that offshore software development can bring down the cost of software development by 50%.

Many times, demand exceeds supply for specialized skills in the U.S. Here comes the need for foreign programmers to fulfill this demand.

According to *Computerworld* ["If you start now, you just might make it," CW, Nov. 20, 1995], the year 2000 date problem is going to cost $300 billion to $600 billion worldwide.

This cost could be reduced by 50% through offshore software development.

India is not coming here. Go there and get the solution.

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No Mac appeal

David Pensak wants Apple to find out what PC users need to switch platforms ["Apple CEO seeks customer talks," CW, Feb. 19]. I am willing to provide some of the answers.

For me to switch [from the PC], Apple would have to improve price, get real keyboards and get a real mouse.

The hard one is that Apple needs a real operating system. Give me a memory-protected, multithreaded and pre-emptively multitasking operating system. Give me a command-line window. Let me get to the guts of the machine. Get rid of the stupid menu bar at the top. Give me a task list that I can call up without having to go to the top of the screen. Let me run more programs than physical RAM will allow. Get rid of the stupid method of dealing with files and drives. To eject a disk you drag it to the trash — shouldn't that erase it? How do you log out of a network? Drag it to the trash — shouldn't that delete the network drives?

I'm not holding my breath. I have heard nothing from Apple so far that would make me even consider a Mac.

Randy Rynkewicz
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More letters, *page 41*

■ Computerworld welcomes comments from its readers. Letters should not exceed 200 words and should be addressed to Paul Gillin, Editor, Computerworld, P.O. Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax number: (508) 875-8931; Internet: letters@cw.com. Please include an address and phone number for verification.

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70. Mining/Construction/Petroleum/ Refining/Agriculture
80. Manufacturer of Computers, Computer-Related Systems or Peripherals
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90. Computer/Peripheral Dealer/Dist./ Retailer
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James Martin

Political barriers can't stop the Internet

In cyberspace, government censors are just "damaged nodes" to be bypassed.

The Chinese government last month decided to regulate the Internet and force all on-line traffic through an official channel for monitoring. The regulations forbid transmission of information considered harmful to state security or "public order."

At roughly the same time, German prosecutors prompted CompuServe to bar access for its 4.3 million subscribers worldwide to 200 sex-related Usenet newsgroups because of local German child pornography laws.

Two very different governments — for two very different reasons — have attempted to impose national authority on the Internet. Slowly but surely, governments are becoming conscious of the Internet and its limitless possibilities.

It's inevitable that some governments will try to restrict and regulate the Internet. But in the long run, most such efforts will fail. The Internet is a worldwide, borderless network beyond the control of any one government.

Internet regulation won't work for this hyper-decentralized network because damage to one node doesn't interrupt communications. Messages are simply routed around the damaged node. Censorship and regulations are treated as damage to be bypassed. Internet servers will sprout in data havens such as the Cayman Islands and Liechtenstein to offer verboten content and transactions.

The Internet is also protected by its sheer size. Millions of messages, millions of World Wide Web sites and thousands of newsgroups all can't be monitored. And the wide use of encryption will make government controls virtually impossible to enforce.

But the most potent defense against cyberregulation is money. Analysts predict the Internet will handle more than $1 trillion in electronic commerce by 2005. Any government that wants a piece of the electronic action shouldn't impose unnecessary roadblocks.

Governments such as China that want to reap the economic benefits of the Internet and simultaneously control the data flow will face a big problem. How do you tell the difference between "friendly" economic information and "unfriendly" political information? It's impossible to limit one and not the other.

This isn't to say the Internet can't or shouldn't be regulated. "Netiquette," the informal, social self-regulation of the Internet, is well-established. Certain behaviors aren't tolerated, and flaming has become a sophisticated art form.

Draw the line

Government involvement should be limited to monitoring terrorism and crime on the Internet. With large volumes of electronic cash trading hands each day, it will be in the interest of governments to create international agreements against fraud and money laundering.

But only nations that promote widespread use of the Internet — without excessive restrictions — will benefit from its economic opportunities.

Some countries seem to understand. Malaysia's deputy prime minister, Anwar Ibrahim, recently said: "Censoring the Internet is not the solution. Simply closing our doors will not only hurt us, but push us back in the race for growth and prosperity."

Martin is a writer, lecturer and consultant on information technology. He is also the founder of James Martin & Co. in Fairfax, Va. His latest book is *The Great Transition*, a text on corporate transformation.

John Gantz

Java: An emperor wearing no clothes?

Sun has pulled off a marketing coup that dwarfs the Windows 95 hoopla.

Java, schmava!

The gullible press is going bonkers over Sun Microsystems' Java programming language. *Business Week* featured Java in its "Software Revolution" report in December. Microsoft made headlines when it promised to support it. Every database and development tool vendor in the world has genuflected in its direction and promised to be Java-compliant in the future.

If you ask me, Sun has pulled off a marketing coup that dwarfs the launch hoopla of Windows 95. I mean, what *is* Java, really? It's a programming language — and a hard-to-learn one at that. When was the last time a programming language actually revolutionized the business? I think it was Cobol. It certainly wasn't APL, PL/1, Pascal, Smalltalk, C or C++, now was it?

But everyone seems to buy in to the Java vision. Instead of writing applications with millions of lines of code, we'll go to a library of Java "applets" and build applications from parts. Applets generally run less than 200,000 lines each. And, oh, by the way, we need only one application that runs at the client (the browser), and the server software will run on any hardware platform.

There's no guarantee all those Java applets are going to work together.

The applets are shipped to the client only when and if they are needed. Of course, with this download-it-when-you-need-it technique, we don't need expensive PCs on the desktop and all the operational overhead that goes along with them.

Right. And next year Java will feed the homeless and cure cancer, too.

Why am I skeptical? It isn't because Java is still pretty much unformed — you still have to hand-code graphics, for instance — or slow. Others will develop point-and-click development tools and compilers that speed up Java. It isn't because I think various versions of Java will sprout in the manner of all the variants of Unix, making portability endlessly elusive. It isn't because companies such as AT&T Bell Laboratories, Macromedia and Microsoft have or are creating alternatives to Java. It isn't because Sun is a hardware company.

No, what scares me is the fundamental concept of building programs out of applets. Here's why:

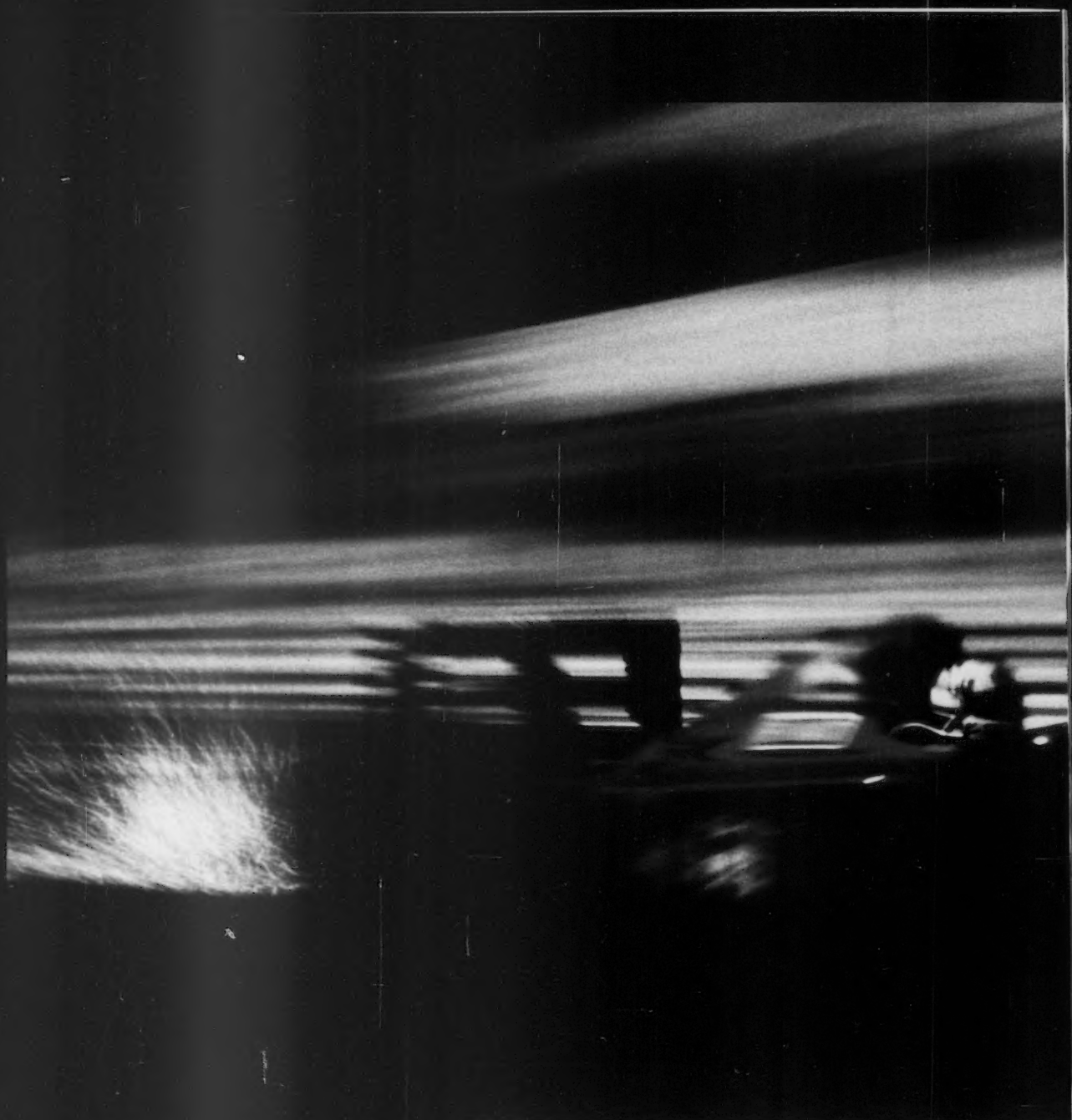
- There are no common design rules for applets. Your spell-checking applet might not work the same as mine, which could affect the behavior of larger programs in which it's embedded.
- There's no certification or testing authority for applets. How do I know the applet I'm renting from Acme Applet will perform as expected under all conditions? How do I know some cyberterrorist didn't build something ugly inside it?
- There's no design science or common wisdom about building programs from applets. How do I get all my applets to work together?

In previous research into reusable software, I discovered that developers almost always preferred using big chunks of reusable code over small hunks because of the cost of design, integration and testing. Even those who believed in the philosophy of reusable software didn't believe that building applications out of small granules of code would ever be practical.

There are times, in fact, I wonder if Java isn't a plot by Sun to sell Java-optimized chips and keep SPARC alive, aided and abetted by Oracle (which would program in Sanskrit if there were even a remote chance of skewering Microsoft by doing so). Helping the cause are all those C++ programmers looking for career enhancement and hackers looking for the legitimacy of becoming "applet developers."

Java will take its market place as just another language. It won't transform the industry.

Gantz is a senior vice president at International Data Corp. in Framingham, Mass.



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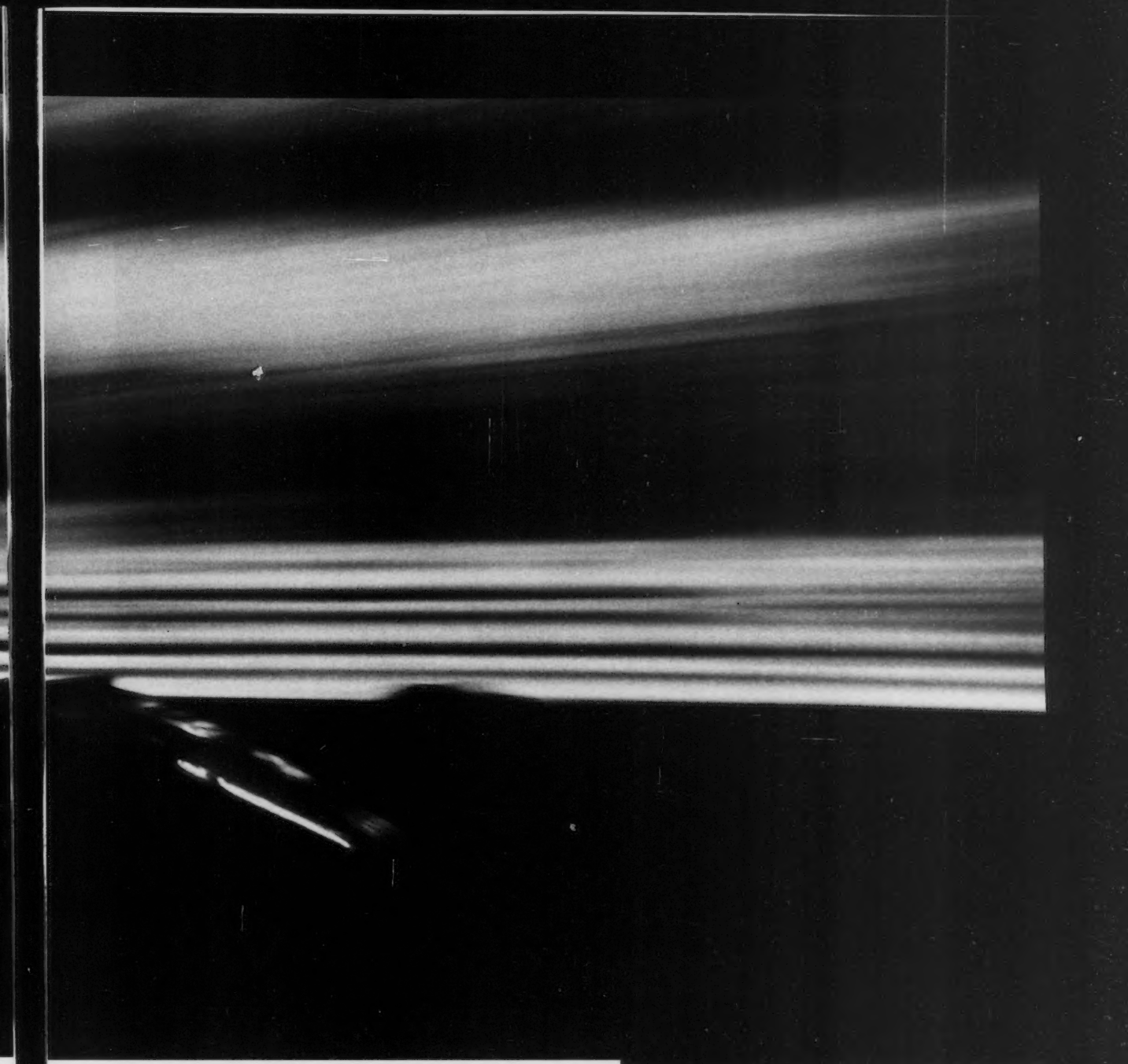

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Letters to the editor

CONTINUED FROM PAGE 36

Management to blame for Duke Power project failure

Your article on the failed Duke Power object project ["Utility unplugs object project," CW, Feb. 26] is another example of technology getting the blame for what is clearly a management failure.

You raise two disturbing questions about this "failure." First, why would Duke Power or Oracle expect to deliver an object-based system in one big "bang"? This approach is the very antithesis of the power and flexibility of developing a new system with objects in an incremental fashion.

Second, why would anyone expect a consulting firm with a core competency in relational database technology to successfully deliver a massive new customer information system built with a technology they know very little about?

Brad Murphy
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Elimination of jobs is nothing to be proud of

The article about Northrop Grumman's Jim McCann and his IS savings ["Target: reduce computing expenses," CW, Feb. 12] was amazing. In the process of eliminating $35 million more in expenses than management asked for, the company eliminated 140 jobs. Northrop Grumman plans to hire college graduates and more contract labor due to the lack of supply of network and systems administrators.

Call me old-fashioned, but I don't think I would be proud of the fact that I eliminated 140 jobs. Pride is when you can say that you kept and retrained existing employees rather than laying them off and hiring others. Even with inflation, $35 million buys a lot of training.

Tommy Hall
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Bleak forecast

Unfortunately, I agree nearly 100% with Patricia Seybold's excellent article in the March 4 *Computerworld* ["The sorry state of systems management"]. I have been a system/network administrator at my company for 13 years, supporting engineering applications and networks and trying to coordinate with MIS and other support groups. I have a global "view" of our network through HP's OpenView platform, but we have no coordinated global system. We even have isolated help desks and parallel support.

I hope Seybold's forecast of more Microsoft influence is not completely correct, as it has been my experience that Microsoft tends to be more difficult to integrate than other vendors and systems. An excellent but unfortunately bleak article.

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Readers debate on-line limits

INTERNET CENSORSHIP

▶ Although I am against censorship, there is a certain level of responsibility that comes with freedom of speech that, as you mentioned, may be better handled by a central authority. I think that if I were 15 to 20 years younger, single and didn't have two small children, my perspective on this might be a lot different.

As it is, I have helped bring life into this world, and I still consider it my responsibility to protect those lives from negative situations (physical and electronic) until they are ready to handle them. In this case, I don't mind the government helping me out with this task.

Jim Kontilis
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▶ Paul Gillin, your argument is riddled with absurd logic ["Defending limits," CW, Feb. 26]. You say you can't watch what your children are doing while they're on-line, so the government should regulate what adult users have access to. Why don't you use a service like AOL that has parental controls available?

You argue that service providers should verify the identity of their users to take the initiative back from the government. The providers do offer parental controls, but it would be impossible for them to identify users, short of running a fingerprint scan. It's up to you, as a parent, to take responsibility for your child's use of the 'net.

You also state that few people argue against laws restricting minors from buying skin magazines at the 7-Eleven. The laws restrict minors, but they do not prohibit the sale of those magazines completely. That is in effect what the indecency provision would do.

Finally, you say that telecom reform may be the only way to stave off a backlash from parents. What exactly might this backlash entail? Parents who decide that their kids should read a book or get some exercise?

Jason Dedrick
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▶ I agree that kids should not be exposed to predatory adults. Nor should they experience unguided, adult sexual fantasy. But limiting the Internet to *Barney* on the chance that a child may see something he cannot understand is unacceptable.

You might as well ban all automobiles on the chance that somewhere a child might play in the road.

There are those of us who believe that Congress, by passing the Telecom Reform Act, has a hidden agenda not to protect children, but to ban all material that its members deem questionable or against their values. As an adult member of a free society, I want the limits on my permitted discourse to be as broad as possible. I'm disappointed that you, an editor, would support any form of censorship.

Steven Long
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▶ First, I haven't heard anyone argue that the restrictions imposed by the Communications Decency Act are too harsh. They are too broad. The CDA specifically bans indecency, and while it's true that obscenity is whatever the courts decide it is, indecency is a much wider net and tends to collect items like *Ulysses*, *The Tropic of Cancer* and a whole school of Shakespeare.

For whatever good intention, Congress is trying to remove First Amendment protections from the Internet, protections that printed matter has always enjoyed. Let's all think long and hard before we sacrifice intellectual liberty on the altar of expedience, because that is what we're being asked to do.

Finally, I sympathize with anyone trying to raise children. It's a scary, confusing world out there. But we can't turn it into an episode of *Barney*. And we shouldn't try.

B. R. Parks
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▶ I congratulate you on the sensibility expressed in your editorial. I find too many of my colleagues hyperventilating over the thought that their First Amendment rights will be swept away in their entirety if the Internet is regulated in any form.

One would presume these same folks would argue that there are no such things as dangerous weapons, just dangerous people.

I rarely hear complaints about having an adults-only rental option at the local video store, but people are appalled at the idea of a third party controlling their on-line desires.

You point out that the industry is far too concerned with growth to consider self-regulation. Is it not the responsibility of governments to provide regulatory frameworks in such cases? If people happen not to like the regulations, perhaps they should get more involved in the political process and try to elect those who support their views rather than whining.

But, come to think of it, I've yet to hear too many of the free-access types complaining about attempts to minimize the spread of viruses, worms, etc., over the Internet.

Perhaps it's only some forms of regulation and censorship that are objectionable?

George Nezlek
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▶ Marc Rotenberg ["Internet privacy: How far should federal regulation go?" CW, Feb. 19] seems to have never read the regulations published in his local phone book.

They clearly describe a broad range of words and concepts he cannot express over the phone. Likewise, bookstore owners and newsstand operators risk fines and jail sentences if they carry certain types of books and magazines.

Jon Pearkins
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▶ I am pleased to find someone in the media who is not horrified that we can place limits on what we receive.

While we all have the right to freedom of speech, we also have the right to freedom of selection. If I do not want to get *Computerworld*, I will not accept it. Does this imply a breach of the First Amendment? No, it implies that I am using my freedom to choose what I want to see.

Therefore, the legislation and controls over the Internet are important until we have the ability to stop information that we do not want to see from coming into our homes.

Think of the kind of person whom you dislike the most. Would you want to be forced to listen/view/see that kind of stuff? Privacy issues need to be addressed as well as the First Amendment.

Arn Kratzer
Santa Clara, Calif.
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Servers & PCs

New Products

VideoLabs, Inc. has introduced FlexCam, an integrated color camera and microphone designed for desktop video and communications.

▶ **VideoLabs'** *videoconferencing Flexcam*

According to the Minneapolis company, the camera and microphone are mounted on an 18-in. flexible, adjustable cord and include industry-standard, line-level audio.

Flexcam works with Apple Computer, Inc.'s AV Macintosh computers, all video digitizing boards for Macintosh and Microsoft Corp.'s Video for Windows. It costs $395.

VideoLabs
Minneapolis
(612) 988-0055
http://www.flexcam.com

▶ **MicroTouch's** *TouchPen monitor*

MicroTouch Systems, Inc. has introduced the TouchPen monitor family of CRT displays.

According to the Methuen, Mass., company, the TouchPen monitors combine integrated touch screen and pen input with high-resolution 15- and 17-in. Diamond Scan CRT displays from Mitsubishi Electric Corp.

The TouchPen monitors were designed to handle applications that incorporate document annotation, image manipulation, signature capture and handwriting recognition.

Pricing for the 15-in. monitor starts at $1,595. Pricing for the 17-in. monitor starts at $2,125.

MicroTouch Systems
Methuen, Mass.
(508) 659-9000
http://www.microtouch.com

Pentium Pro servers near launch

By Bob Francis

There's good news for companies that are implementing high-powered application servers: New systems powered by Pentium Pro processors are arriving with attractive price stickers.

The systems were designed as high-end application servers that run Windows NT applications, analysts said.

Their pricing looks aggressive, based on companies that have already announced them, said John Dunkle, president of Workgroup Strategic Services, Inc., a consulting group in Portsmouth, N.H.

"Price is a moving target. It could get pretty brutal out there," he said.

Sales of symmetrical multiprocessing (SMP) boxes grew rapidly last year, and users said they would look at coming SMP-capable systems. "We'll be examining these new systems to see how they fit into our plans to deploy Windows NT servers," said Bert Loveland, an information systems consultant at Northern States Power Co. in Minneapolis.

A newly aggressive IBM PC Co. unveiled its offering at CeBit in Hannover, Germany. The PC Co. announced a four-way SMP system based on Intel Corp.'s 166-MHz Pentium Pro. Prices will start at $18,995, and the machines will ship in May.

The following systems also were announced:

- Advanced Logic Research, Inc. in Irvine, Calif., will ship Revolution Quad6 next month. Prices will start at $14,995.
- NEC Technologies, Inc. in Boxboro, Mass., will ship the ProServa SH line in the second quarter. Prices will be announced later.
- Hewlett-Packard Co. and Compaq Computer Corp. next month will offer Pentium Pro servers, sources said. The Compaq system will include scalability from one to four 166-MHz Pentium Pro processors, hot-swappable 2G-byte Fast and Wide SCSI disk drives, built-in 10/100M byte Ethernet connections, and a Peripheral Component Interconnect architecture integrated with Compaq's TriFlex system. HP will release a similar model at about the same time. Compaq and HP officials wouldn't comment on unannounced products.

New Pentium Pro servers from IBM, NEC and ALR *(pictured)*

Processor: One to four 166-MHz Pentium Pros
RAM: 64M bytes, expandable to at least 1G-byte error checking and correcting RAM
Slots: At least eight expansion slots
Drive bays: 10 or more
Starting price: $14,995

The competition has lowered the expected costs of Pentium Pro servers. When Intel announced the Pentium Pro and the surrounding server chip set, most vendors expected systems to initially be priced above $20,000. Improved chip yields and lower memory and disk drive prices also have helped lower costs.

But not every company is rushing into the Pentium Pro server battle. Dell Computer Corp. in Austin, Texas, and AST Research, Inc. in Irvine, Calif., plan to wait until later in the year. Dell officials said the firm, which hasn't succeeded in the server market so far, is changing its distribution model to better handle servers.

Cheap, NT-based mirroring released

By Jaikumar Vijayan

A new Windows NT-based mirroring product increases PC server fault tolerance.

Vinca Corp.'s StandbyServer NT software lets network administrators mirror data from a primary NT server to a standby system via an industry-standard Peripheral Component Interconnect (PCI) link.

Mirroring

If the main server fails or is shut down, the software automatically switches operations from the main to the secondary server, from which users can access the mirrored data in less than a minute. The software will ship in April and will cost $2,999, Vinca officials said.

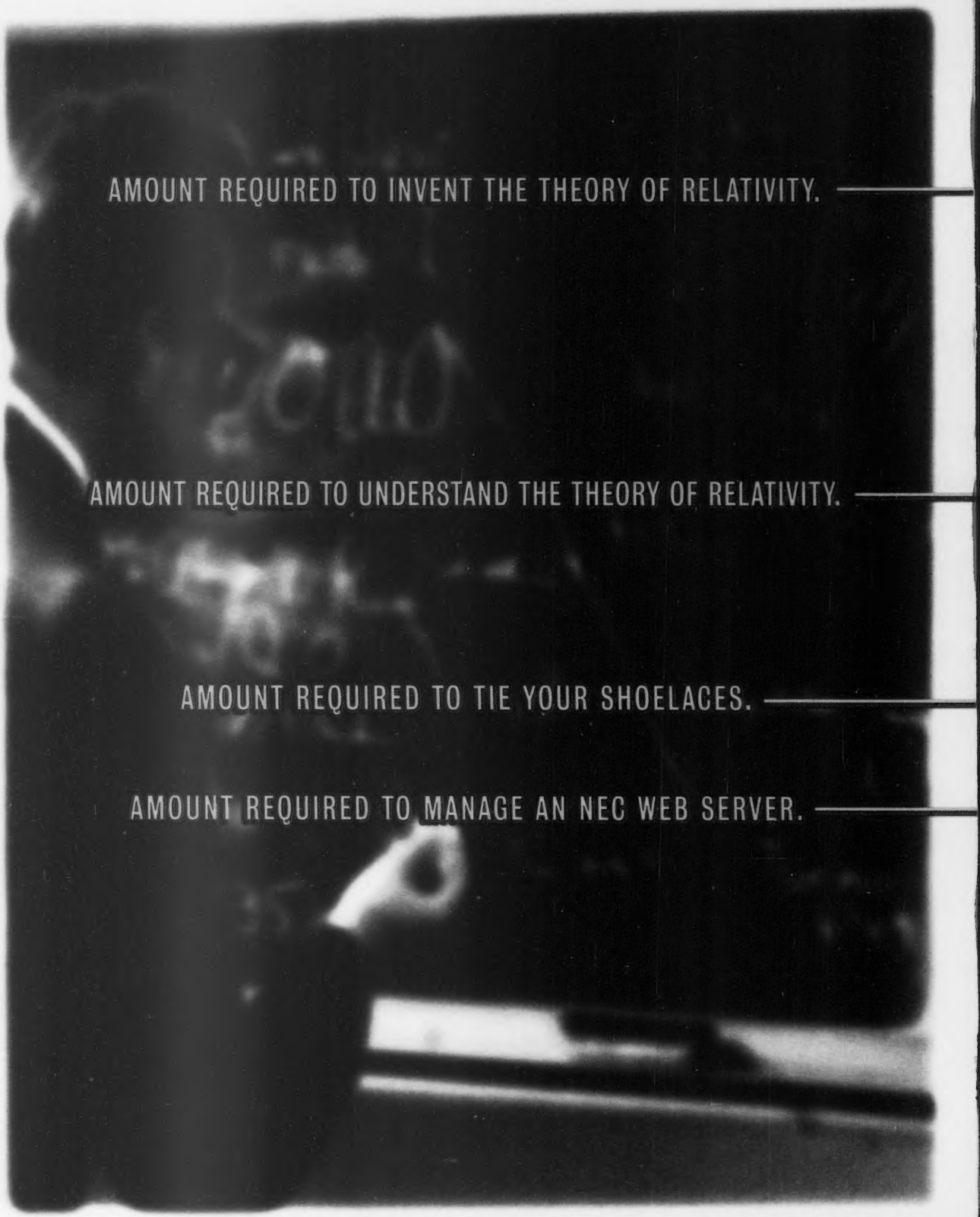
StandbyServer NT provides increased fault tolerance for PC server owners who are unable or unwilling to pay for the considerably more expensive but more robust fault tolerance provided by technologies such as Novell, Inc.'s System Fault Tolerance (SFT) III, analysts said.

SFT III mirrors server memory and disk storage. It can also continually monitor secondary and primary server performance, which allows completely transparent switchovers in case of a server failure.

Typically, these features make SFT III about two to five times more expensive than Vinca's product, according to analysts.

Nevertheless, industry watchers said, Vinca's wares are sought after. StandbyServer is "a good product. A lot of users we talk

Vinca, *page 49*



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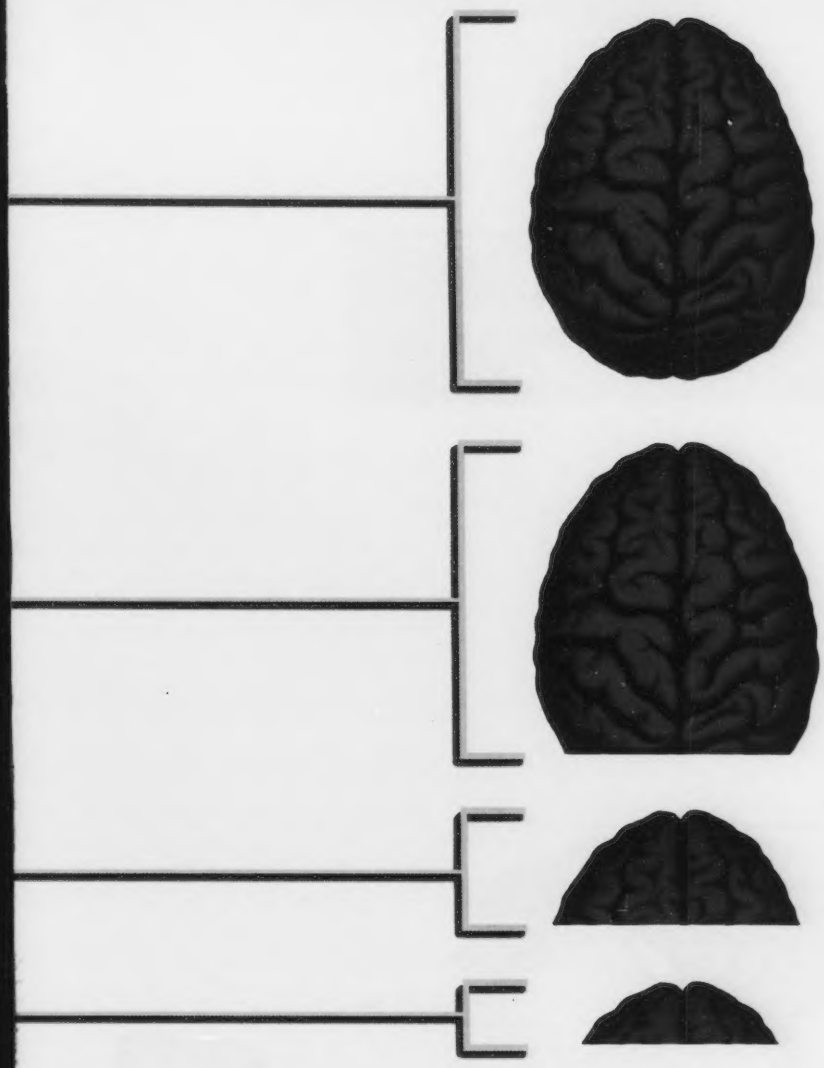

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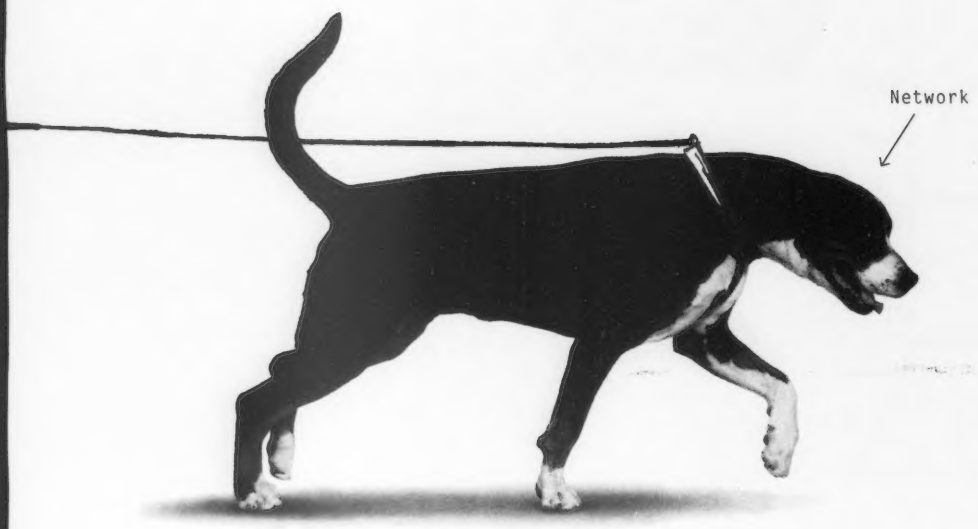

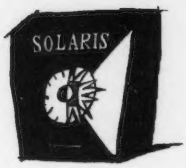

And so do the analysts at D.H. Brown. In a recent study, they ranked Solaris™ as the best enterprise network operating system*. Ahead of Windows NT. And above NetWare.™ Then again, why wouldn't they? After all, Solaris provides serious power you can add to your PC workgroups. While protecting your NetWare and Microsoft Windows investments. And because the Solaris operating environment is optimized for Pentium® and Pentium® Pro servers, your PC users will have access to information throughout the company faster than ever before. From almost any 32-bit database you're running. It even helps manage your multiple LANs from any single location, and lets you put all your workgroups on the Internet. Easily and securely. To get the study that shows why Solaris is so highly thought of, call us at 1-800-SUNSOFT, prompt #1. For more information see us at http://www.sun.com/solaris/ The solution is well within reach.

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Vinca

CONTINUED FROM PAGE 45

with are asking for the kind of fault tolerance that Vinca is offering," said Bob Sakakeeny, an analyst at Aberdeen Group, Inc. in Boston.

Vinca's software works with any standard Intel Corp.-based PC server. It is different from SFT III because the primary and secondary server don't have to be identical. But the Vinca setup requires the free disk space on the secondary server to be large enough to mirror the primary server's disk space.

Users load the software on the main and backup servers and use industry-standard PCI cards and cabling to hook them to each other. Users need to buy their own adapter cards and the cabling that physically links the two servers.

Vinca, an Orem, Utah, supplier of storage networking products, ships similar versions of the product for Novell's NetWare and IBM's OS/2 environments. Allied-Signal Automotive and Energy Venture, Inc. are among Vinca's customers.

Users of Vinca's earlier NetWare and OS/2 versions of StandbyServer said the product has helped them. "We've used it for some time now, and it's been great," said Alan Walker, network coordinator at the Institute of Real Estate Management in Chicago. The institute has had times when the primary server failed, and the secondary automatically took over before the failure was detected.

The institute chose Vinca's StandbyServer for NetWare instead of SFT III because of the lower cost and because some of its applications weren't compatible with SFT III, Walker said.

"It's not an endorsement of the company, but it has been a pretty useful product for us" because it provides 24-hour data backup facilities, said Kumar Punjabi, project manager of networks at Circus Circus Enterprises, Inc. in Las Vegas, which uses an earlier Vinca backup product.

The Moody Blues

Vinca StandbyServer

What it is: Real-time server mirroring software
What it does: Increases fault tolerance
Other platforms supported: OS/2 Warp and Novell NetWare
Price: $2,999

Briefs

DEC bundles BackOffice

Digital Equipment Corp. is bundling Microsoft Corp.'s BackOffice server software with select models of its Prioris PC servers. The bundle is available in Digital's Prioris HX5166 and ZX5133MP/2 symmetrical multiprocessor servers.

Nokia handles voice, data

Nokia Mobile Phones unveiled a wireless, digitally based data and voice communicator. The Nokia 9000 Communicator will run on the Geos operating system from Geoworks and will be available in Europe and Asia this summer. It lets users receive faxes and electronic mail, send short messages and access Internet services.

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Borland's Delphi 2.0 supports rapid development, 52

Software

AIG plunges in

Insurer takes three-tier step with Sybase contract

By Dan Richman

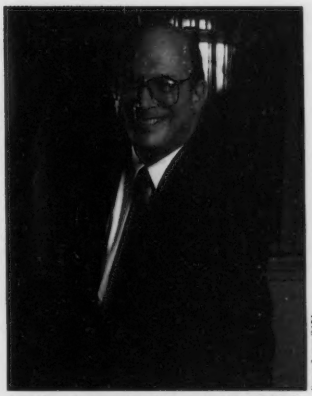
The largest insurance company in the U.S. hopes a multimillion-dollar contract it signed earlier this month with Sybase, Inc. will lay a client/server foundation to help it maintain its competitive lead.

American International Group, Inc. (AIG) in New York has agreed to license Sybase's full range of products and services. The contract is worth between $2 million and $9 million, industry watchers said. Neither Sybase nor AIG would reveal the contract's size.

AIG is installing a new three-tiered architecture, compliant with the Distributed Computing Environment (DCE), domestically and in 100 locations worldwide.

DCE is a set of industry specifications for interoperability. Three-tiered architecture refers to a desktop client, an application server where the logic resides and a database from which the application draws data.

"It is a big deal for our company in terms of moving to more powerful computers, making important information available to more people and doing data mining" that can show trends and indicate where additional business might lie, said Mark Popolano, an AIG vice president.



NAILAH FEARNY/SABA

American International Group's CIO Jeff Stoll *says he hopes the insurer's new client/server direction will help it remain No. 1*

Competition is key

With some 32,000 employees in 130 countries, AIG feels enormous pressure from competitors within the industry, and its executives see the technology in this contract as critical to remaining competitive.

"The insurance industry is basically playing catch-up technologically," Dean Witter Reynolds analyst Michael Lewis said. But those companies that catch up fastest will have an edge.

Insurance companies are finding that "mainframe applications can't be changed fast enough to let them get new products out the door within the 12 to 18 months that new products usually live," said Robert Fronk, vice president of technology at Symmetrix, Inc., a developer in Lexington, Mass., that specializes in insurance. "There's a lot of pressure to speed up development, access to data — anything that makes better use of time and helps distinguish one competitor from another."

Right now, like many insurance companies, AIG does most of its computing on IBM-compatible mainframes that run DB2 database software. Client/server computing isn't popular in the insurance industry except in limited roles, such as tracking investments.

AIG isn't considering moving away from mainframes for its transaction processing. But it does want to get away from users' dependence on information systems personnel for reports on premiums collected in the last

AIG, *page 57*

Briefs

OLAP meets reporting tool

Business Objects, a query and reporting tool from **Business Objects, Inc.**, by the end of the year will gain the ability to access data within Essbase, an on-line analytical processing (OLAP) server from Arbor Software, Inc. Access will be achieved through a driver that may sell for $195 per user, though final pricing hasn't been determined.

Sinper changes its name

Sinper Corp. in Warren, N.J., is now **TM1 Software, Inc.** The company also will announce Version 6.0 of its TM1 Server, which it said performs OLAP 100 times faster than earlier versions. It will ship by July 1 for Windows NT, Solaris, HP-UX and AIX, starting at $7,000.

IBM aims Notes at legacy users

Software to be gateway to large systems

By Tim Ouellette

IBM forked over $3.5 billion last summer to buy Lotus Development Corp., mainly to get its hands on Notes and rule a segment of the desktop market. But plans for the groupware are actually broader in scope: IBM intends to make Notes the desktop PC user's gateway to the company's extensive large systems family.

In fact, IBM hopes to diminish the importance of PC operating systems and lessen Microsoft Corp.'s dominance by using Notes as a key middleware component, according to a report by D. H. Andrews Group in Cheshire, Conn.

Notes now has ties to a number of IBM's traditional back-end data storage, processing and transaction systems (see chart). And IBM has made a Notes server an important component of its Project Eagle suite, which the company will announce this week (see related story, page 14).

"Notes organizes and structures and coordinates unstructured data," said Gary Alpert, a senior strategist at IBM. But users still need to access reams of structured data managed by IBM's legacy systems, he added.

Notes-tying

And Notes should pave the way toward tying together those various legacy systems, said analyst Matt Cain at Meta Group, Inc. in Stamford, Conn. Making Notes the desktop interface will breathe new life into such systems and help IBM get Notes into sites with existing IBM equipment.

For example, the CICS Gateway for Lotus Notes allows a Notes server to communicate directly with CICS transaction systems, providing one-stop access to Notes as well as legacy data. And the MQSeries Link for Lotus Notes allows Notes applications to communicate indirectly with CICS and other back-end applications via the MQSeries' message transport software.

"In order to provide a complete process, the Notes process also has to go to a CICS application," said Ron Berry, a technical risk analyst at Barnett Banks, Inc. in Jacksonville, Fla. "Our strategy for Notes was at first to use the collaborative database groupware concept. But now users see Notes as a data-entry system into our consumer loans products, for example."

And one hospital has seen the combination of Notes with legacy systems improve its financial situation. The Niagara Falls Memorial Medical Center in New York is using Notes and MQSeries to automatically download billing information to its mainframe, said Dick Witkowski, director of information systems. He said the hospital expects this year to decrease support staff costs by $180,000 and increase revenue by $138,000.

IBM's first stab at incorporating Notes as part of a middleware suite will come this week with Project Eagle, a suite of back-end application servers that lines up competitively against Microsoft Corp.'s BackOffice. In effect, Notes provides the desktop access to these other back-end applications.

The ties that bind

Lotus Notes will be connected with these IBM large systems:

- MQSeries Middleware
- CICS transaction processing monitor
- ImagePlus imaging software
- Flowmark 2.2 workflow software
- A native version of Notes on the AS/400 due in 1997
- A Notes server will be bundled as part of the Project Eagle suite of server applications

Application Development

Delphi 2.0 supports rapid development

By Howard Millman

Building high-performance, scalable applications for Microsoft's Windows 95 and Windows NT just became easier with Borland's object-oriented Delphi 2.0. This major upgrade to the year-old development system weds a high-performance compiler and an encyclopedic feature set to a scalable, multithreaded architecture.

Review

Available in three versions, Delphi 2.0 fully supports Windows 95 controls, long file names and the Windows 95 application programming interface.

We tested Client/Server Suite, the most comprehensive of Borland's three versions. Used to design workgroup and departmental-class applications, Client/Server includes Intersolv, Inc.'s PVCS version-control manager, SQL tools and advanced application scaling utilities.

Borland has positioned the Developer edition to meet the needs of LAN-oriented developers. Desktop, the least costly version, builds complete applications but lacks the team-oriented and time-saving tools offered in the other editions.

$250

Borland has fortified the three versions with more than 100 drag-drop-and-scale visual components and a speedy, 32-bit native-code compiler. The upgraded compiler provides more coherent error messages than its predecessor and catches errors all at once instead of one at a time.

Another feature contributing to rapid application development is Object Pascal's reuse of code. We saved random chunks of object-oriented code as Dynamic Link Libraries for reuse in other applications. Borland tuned its Object Pascal programming language to gain performance and added support for integer, strings and OLE, plus other variants.

Modular tools manage development

To build a test application, we chose components, or objects, from the dozens available on the multitabbed Component Palette. We stretched the components to size and dragged them to their location. Next, we modified each component's attributes with Delphi's Object Inspector, the property manager box that customizes every aspect of a component's behavior and appearance.

To key in new code or tweak existing source code, we used the Code Editor. We liked the editor's ability to display the entire application's code or just a selected range.

You can convert Delphi 1.0 source code into 32-bit code, as we did, using the Build command. One caveat: You will run into problems if the 16-bit Visual Basic controls have no OLE control equivalents. To assist developers migrating from 16-bit to 32-bit, all versions of Delphi 2.0 ship bundled with Delphi 1.0.

Other design aids include a Project Manager, which lists each form in an application. The DataPump Expert — available in the Developer and Client/Server versions — increases the capacity of the database to the limit set by the developer. Delphi's Object Repository stores forms and other objects that you can share among applications and with other developers.

Data Modules, a specific-purpose form available in all versions, likewise stores data, events and procedures. By separating data presentation, access and business logic from the form, Data Modules eliminate the need to place all table definitions on one form. This makes for a cleaner, less cluttered development environment.

Delphi's OLE Automation Server encapsulates data access procedures, making the procedures available to any client application that uses an OLE Automation-compliant language. Supported standards include Open Database Connectivity, OLE controls, Remote Automation and Microsoft's forthcoming Network OLE.

Borland has positioned *the Developer edition of its Delphi 2.0 Client/Server Suite to meet the needs of LAN-oriented developers*

Delphi's OLE automation servers can be used remotely, but the program doesn't include the control software needed to establish remote links. It requires third-party utilities to set Registry values.

Wedding a 32-bit compiler with the 32-bit foundation of Windows 95 and Windows NT 32-bit endows Delphi 2.0 with lots of zip. Borland claims, and our informal tests confirm, a 300% performance improvement in its run-time executables compared with Version 1.0.

According to Borland, Version 2.0's executables also run significantly faster than the executables from Microsoft's Visual Basic. Compiled code, which is used by Delphi, generally runs faster than interpreted code, which is used by Visual Basic. Borland claims that Delphi executables run 15 to 50 times faster than executables built with Visual Basic's interpreted P-code. We weren't able to confirm or disprove this independently.

Millman operates Data System Services Group, a networking and problem-solving consultancy. He is based in Croton, N.Y., and can be reached at hmillman@mcimail.com.

Books about objects

◗ *The Object Technology Revolution,* **by Michael Guttman and Jason Matthews, John Wiley & Sons, Inc., New York, 184 pages, $24.95**

This is a basic road map and a good thing to give anyone who needs to know why they need to know about object orientation. ("It will change the way you do business," the book's cover promises, along with other reasons.) Especially given what is usually considered pretty dry subject matter by anyone outside the computer industry, this book is a fun read. It puts object orientation into layman's terms, using things such as taxicabs to explain object classes. One of my favorite subheadings: "Buddy, can you spare a paradigm?"

◗ *Reengineering Cobol with Objects; Step by Step to Sustainable Legacy Systems,* **by Robert Levey, McGraw-Hill, Inc., New York, 257 pages, $40**

This seems like an indispensable guide for any large shop that wants to update its mainframe applications without having to redo everything all at once. The basic premise is that your old Cobol applications don't have to be an albatross that prevent delivering new services to your end users. Instead, the author says, updated Cobol systems can be the basis for the move to new technology and new services. After going through some preliminary info about Cobol and objects, the book delivers what it promises: a step-by-step guide on how to do this.

◗ *OLE Automation Programmer's Reference,* **Microsoft Press, Redmond, Wash., 399 pages, $24.95**

This book tells you everything you might want to know about OLE Automation, which essentially is how you use OLE objects to create applications that have objects in their user interfaces or somewhere behind the scenes. OLE Automation also lets you create tools, including macro languages and browsers, that access and manipulate objects. Among other things, the book defines standard OLE Automation objects, provides naming guidelines and shows how to create type libraries. It is recommended for professional programmers who already have some familiarity with objects or at least know the basics of object orientation and OLE.

◗ *Object Orientation,* **second edition, by Setrag Khoshafian and Razmik Abnous, John Wiley & Sons, Inc., New York, 504 pages, $34.95**

This one is for serious object geeks or those who want to become serious object geeks. The first chapter lays out, in fairly plain language, what object orientation is, what "inheritance" means and other basic concepts. Then things get decidedly more techie, with chapters devoted to abstract data types, inheritance, user interfaces, object-oriented methodologies including Booch and the Object Modeling Technique, and object-oriented languages including Smalltalk and Eiffel. There is a chapter on standards, including Common Object Request Broker Architecture and OLE. A handy appendix provides vendor names and other contact information.

—Johanna Ambrosio

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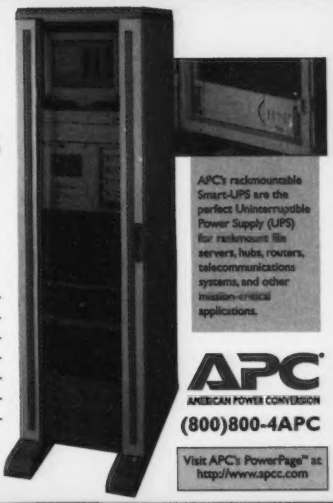

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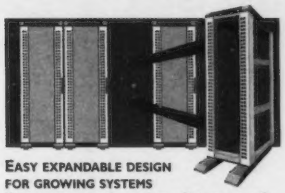

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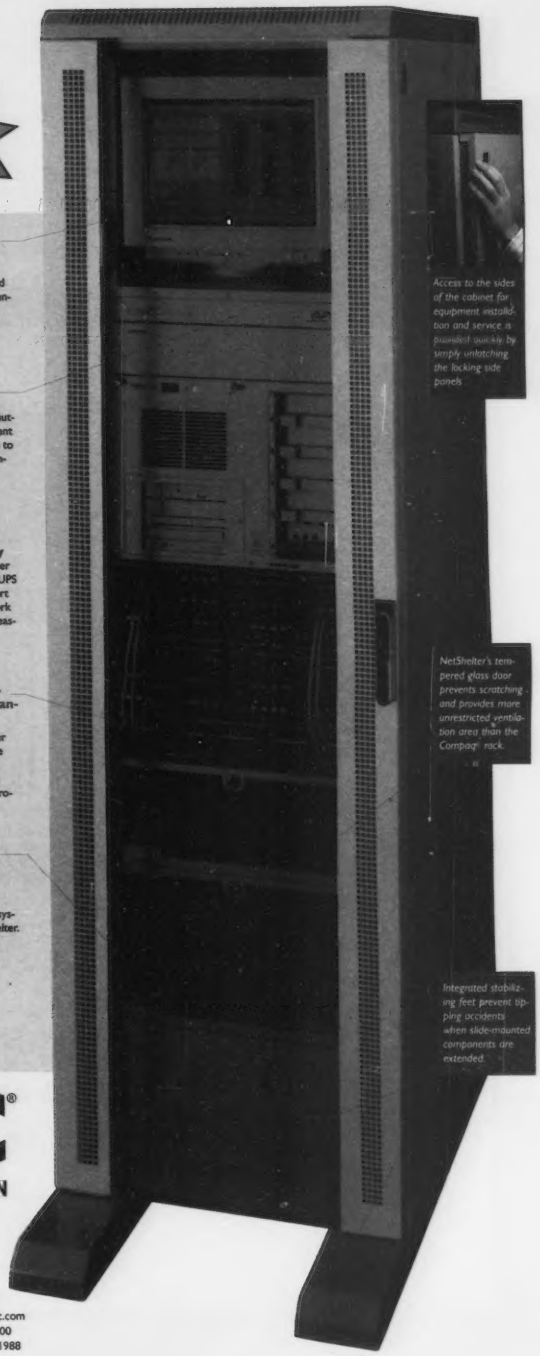

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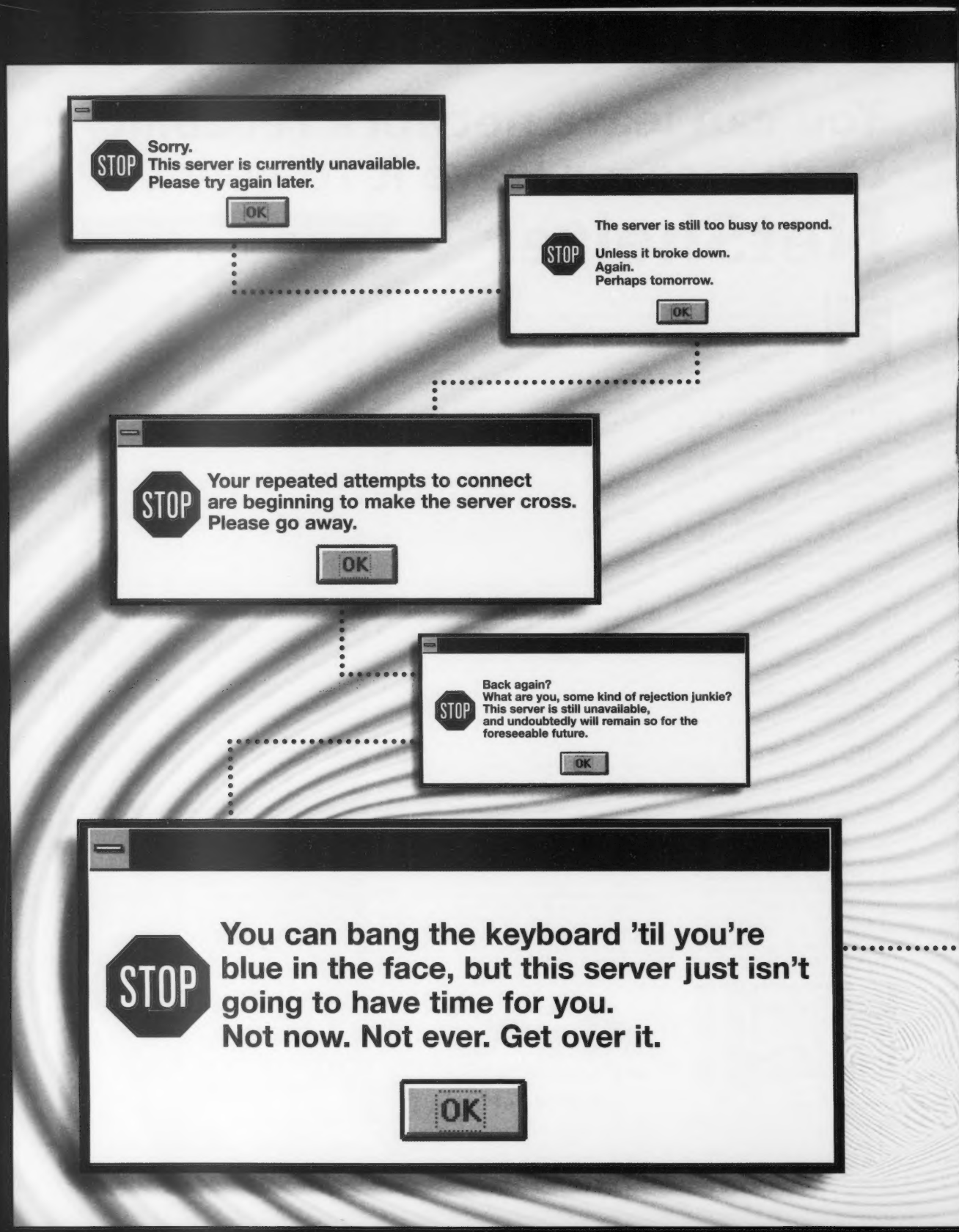
STOP
Sorry.
This server is currently unavailable.
Please try again later.
OK
The server is still too busy to respond.
STOP
Unless it broke down.
Again.
Perhaps tomorrow.
OK
STOP
Your repeated attempts to connect
are beginning to make the server cross.
Please go away.
OK
STOP
Back again?
What are you, some kind of rejection junkie?
This server is still unavailable,
and undoubtedly will remain so for the
foreseeable future.
OK
STOP
You can bang the keyboard 'til you're
blue in the face, but this server just isn't
going to have time for you.
Not now. Not ever. Get over it.
OK

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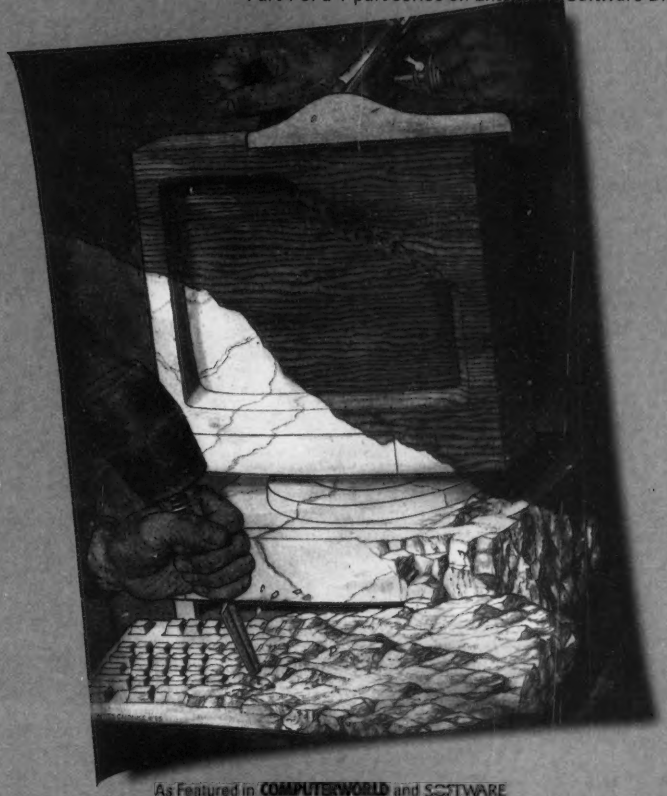
White Paper

IDC

Selecting Tools For Distributed Computing

Part 1 of a 4-part series on Enterprise Software Directions



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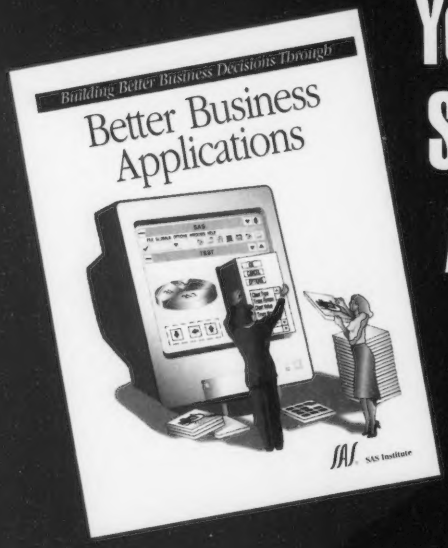

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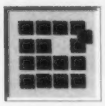

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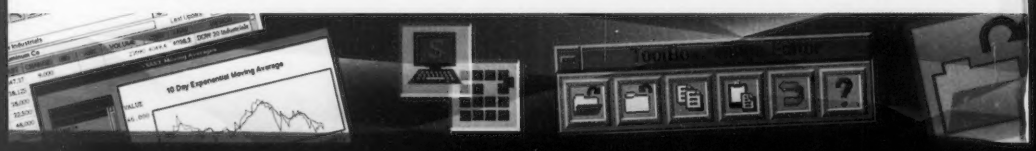

Introduction

Development Challenges Getting Tougher

Today, the challenge for application developers is in distributed software, whether that be client/server, peer to peer or Internet applications. However daunting this challenge is, the challenges of tomorrow, which will include developing applications for distributed object environments, will be greater.

This White Paper will explore the state of the art in client/server development and distributed development. It will also advise readers how to select tools for a particular application development problem.

Many of the findings inside stem from a July 1995 survey of 835 application development managers from different industries in the U.S. These sites (by sites, we mean single contiguous locations) ranged from one to 35,000 employees, with a median of 150 employees. Enterprises, comprising multiple sites, averaged 580 employees and ranged to 300,000.

Of these 835 managers, 64% were currently developing client/server or distributed applications at their site. These managers currently employ many distributed application strategies, a diversification policy that IDC believes will continue. Of sites with fewer than 100 employees (which this White Paper will refer to as small sites), only 36% have adopted new tools for client/server development. But that figure rises to 53% for the sites we will call "mid-sized" (those with 100 to 499 employees) and 78% for "large" sites (those with more than 500 employees). In other words, the propensity to purchase new development tools depends on one's overall development strategy, organization size and industry.

Businesses are increasing their development of distributed applications. Most of this increase will come from internal development. To maximize the results of that internal development, managers must consider many factors. Inside we will examine these factors so you can begin your planning process for the brave new world of application development.

Watch for the remainder of the Enterprise Software Directions Series:

Data Warehousing	June
Financial and HR Applications	September
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This White Paper was written by Tony Picardi, Group Vice President of Worldwide Software at International Data Corp., Framingham, MA. He has overall responsibility for all software, including packaged applications, application development tools and system-level software, and specializes in high-level development languages. Picardi holds an ScD in systems analysis from MIT and has 21 years of experience in systems consulting and product marketing at various software tool vendors. IDC is the IT industry's leading provider of market research and consulting services.

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Selecting Tools For Distributed Computing

Distributed application strategies are in a state of flux. The number of sites relying primarily on 3GLs is declining. Single vendor integrated development environments (such as a DBMS with an integrated 4GL, CASE or object-oriented language) are on the rise, as are multiple development paradigms, such as those involving the use of both 3GLs and advanced tools (see Fig. 1).

By year-end, 65% of the 835 sites that IDC surveyed (see p. 3) will be developing applications internally. More than half of the sites doing internal development will have adopted new tools to help their programmers build client/server applications.

To select tools for an application development problem, there are four steps to follow. First, determine the magnitude of your development challenge. What are the scalability issues, in terms of both size and complexity? Second, appraise your development paradigm. (Omitting this step wastes time and has damaged careers.) Third, filter out the tools that are inappropriate in terms of organizational culture and scalability. Fourth, roll up your sleeves and try out the remaining tools . . . feature by feature.

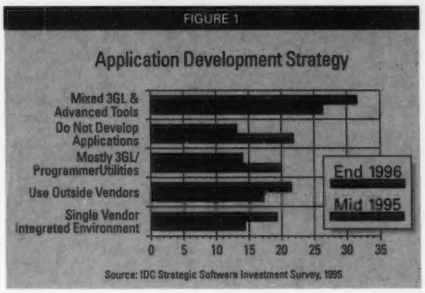
Development staffs grow, but the legacy remains

Development staffs are growing; 42% of the managers surveyed said their staffs will expand by an average of 15% in the next 12 months. Of this 42%, sites developing applications internally account for 78%, a figure that will reach 87% by year-end.

In any organization, developer resources are precious. How much time is devoted to application development? How is that time allocated between maintaining existing applications and creating new code? Such issues have a big impact on tool selection.

The sites surveyed averaged 38 employees per full-time IS employee. Of the IS employees, 29% did only application development and maintenance programming, as opposed to other IS tasks such as database administration, help desk and LAN management. This programming staff was allocated 52.2% to maintaining existing applications, 21.8% to re-engineering those applications (including adding GUIs and migrating code to new platforms) and 26% to developing new applications, with little or no reuse of legacy applications.

FIGURE 1



In other words, a relatively small percentage of total IS staff works on new development, while up to 75% of them work with legacy applications. The requirement that developers do legacy maintenance and re-engineering precludes many practical IS managers from adopting new tools.

Challenge of distributed application development

Scalability of both size and complexity is a key criterion in choosing development tools for the new distributed applications. To get an idea of the current application scale and how it is changing, IDC asked developers about their distributed applications. How big and complex are client/server applications now? How do developers expect size and

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complexity to change by year-end?

According to respondents, the two most popular client/server applications are information access and transaction processing (OLTP). Office automation is a distant third, followed by event-driven workflow and realtime process control. (See Fig. 2.)

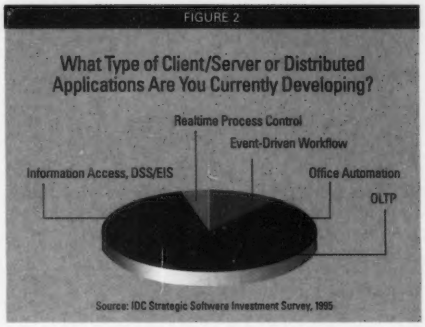
The intended number of users for client/server applications under development varies by site size. At small sites, applications average 232 users and will grow to 385 users by year-end, but half currently have fewer than 20 users. At large sites, applications start out serving 640 users and will grow to over 1,532 users by year-end, but half currently have fewer than 53 users.

Note the disparity between the average number of users but the high number of sites with just a few users. Most applications serve the workgroup, but a few move up the organizational hierarchy, i.e., are scaled up. This is why the issue of application scalability is so daunting. If your application is destined to scale up, the number of users of that application will likely increase geometrically. An application originally designed for 20 people may need to span to 10 times that number of users in a single bound.

Although only 25% of the sites have 500 employees or more (therefore having the larger applications), applications at these sites are expected to grow to four times the size of those at smaller sites.

Developers have similar expectations for their applications' transaction loads. Most applications involve information access, implying little or no transaction load. But for OLTP-type applications, developers expect loads of 77,000 transactions per day. By 1997, that daily average will jump to 126,000. The average size of the application database is expected to be nearly one gigabyte.

FIGURE 2



By implication, size scalability is a function of number of networks, servers and server types. As the number of users grows, heterogeneity of the environment also increases. An application designed to work on one LAN has to cross one scalability bridge to work on multiple LANs, another for a WAN, another for multiple types of servers (i.e., different network operating systems) and a final huge bridge: using standards-based technology and protocols

Where Tools for the Internet Fit in the Development Picture

Scripting languages (such as Java, Sun's interpretive 3GL with a 3GL's built-in flexibility, and JavaScript, a scaled-down 4GL-like version that can add application, machine and/or platform-specific extensions to Java languages) generate interpreted code that will run on a variety of user interfaces once the application is downloaded.

Many developers of client/server OLTP applications who are using 4GLs or CASE tools would find it more cost-effective to have their 4GL or CASE tool generate Java for Internet clients.

In the next 12 months, Java code generators will be released to more closely fit this group's development paradigm. It will take Internet-centric Visual 4GL or RAD tools to popularize Internet development, as PowerBuilder brought client/server to the early majority. While Java has immediate appeal for the 1 million or so C programmers, an Internet-centric 4GL and RAD tool would lure the millions of non-3GL programmers.

Internet tools for creating simple server-centric information access types of applications already exist. Development managers should look for the 1996 crop of Internet tools to be able to treat the Internet server as any other node in a heterogeneous application architecture and generating secure transactions as well as downloading parts of the application to run on the Internet client.

(such as DCE) to be truly distributed. Many software architects solve these problems with middleware, but the development tools themselves are often the cause of failed scalability, either due to a lack of partnered (or embedded) middleware or subtle performance problems that only crop up when crossing the bridge from a simple world to a complex one.

The vast differences in size scale between applications affect the choice of development tools. A tool may be adequate for one business but inappropriate for another because the initial size scale is greater by multiples. Just as important, a tool chosen for the prototype may not be appropriate when loads increase by multiples in a short time.

Developers also face challenges in application complexity (IDC calls it complexity scalability). Distributed applications are complicated by multiple-vendor DBMSs, complex rules-based logic and event-driven logic, all of which require sophisticated programming. Tools chosen will depend on where one is on the complexity scale and whether the complexity stems from integrating data from multiple DBMSs or working with heterogeneous networks.

Development process integration is critical

Most IS managers require a wide variety of tools. But how do they get these tools to work together? In Fig. 3, 27% of IS managers want total integration of the entire development process, from requirements to application management; 23.5% want to standardize on a database and add only integrated tools, either from the DBMS supplier or third parties. Over half the respondents use one of these two strategies, indicating that for most developers, integration of the development process is a must.

What kinds of tools are developers using? How is the use of tools changing? Fig. 4 shows the percentage of development staff using various languages in mid-1995 and the expected distribution of languages by year-end. Four conclusions can be drawn:

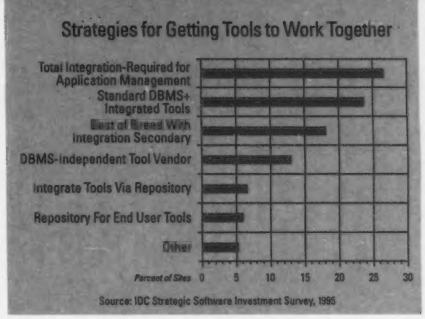
1) Cobol is still the most popular development tool and will remain so in the short term (due to the need to maintain and re-engineer existing Cobol applications). Cobol's decline has been accompanied by increased use of C and C++. Most programmers use the latter in a 3GL paradigm, even though newer tools offer higher productivity.

Vendors are giving developers the means to raise productivity while staying with the same paradigm. For example, Visual Object Cobol from Micro Focus and Microsoft Visual C++ can increase productivity for Cobol and C/C++ programmers, respectively. It remains to be seen if IBM and Micro Focus can stem the slow exodus from Cobol with their new OO Cobol and related class libraries and components.

2) The most growth is occurring in client-centric tools such as Visual Basic and 4GL RAD tools such as PowerBuilder and SQLWindows. This is consistent with the rapid increase in client/server development and also with the need to re-engineer existing applications via an added graphical front end.

3) Smalltalk and other object-oriented languages are used by the segment of the developer population we call visionaries. (This includes the tiny fraction of C++ users who have implemented a true object-oriented development framework and develop their own formal reusable class libraries.)

FIGURE 3



4) Use of both CASE and 4GLs is increasing (reflecting the need for integrating environments) but CASE is increasing proportionately faster than the classic 4GLs. IDC's interpretation is that CASE vendors are now simplifying the development process without high retraining costs (i.e., traditional CASE, which was shunned by most developers).

Development managers want total process integration, but no single tool can fulfill all the requirements for each step of the development process. To achieve their goal, integration-minded developers

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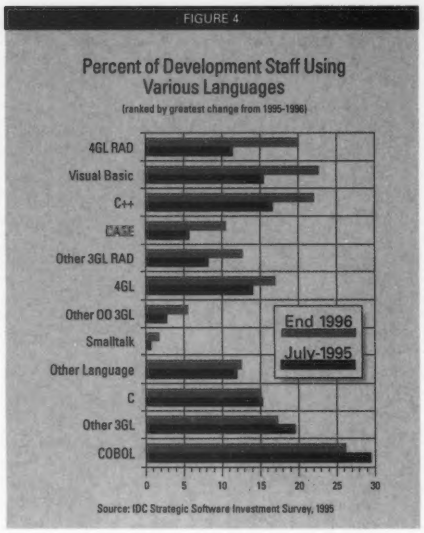
must combine language tools and non-language or process management tools.

The most popular non-language tools used by developers to integrate their processes are software distribution, configuration and version management, project management and project planning (see Fig. 5). Component software and purchased class libraries will support object-oriented strategies.

FIGURE 4



Growth at this early stage, however, is mainly due to the purchase of components — visual objects — to support Visual Basic programmers.

The change in test tools shown in Fig. 5 is modest, but virtually all of it is in test tools for distributed applications, a category that barely existed two years ago but is now booming. Development managers are realizing that their investment in regression tests is a corporate asset. This realization drives the growth in the integrated testing "platforms" that offer traditional keystroke capture and playback or specification-based testing as well as test suite librarians and test process management software.

Only a fraction of developers currently use standalone repositories. The vast majority prefer their repositories tightly integrated with their 4GL, CASE or object-oriented tool.

No one tool today can deliver a totally integrated development environment. Nor can any single tool deliver cost-effective development across the scalability spectrum. This paradox is that powerful tools that facilitate abstract and automated generation for complex environments are too costly (in terms of licenses and retraining) for simple tasks; easy-to-use tools do not deliver the scalability needed for the high ends of the size or complexity spectrums.

Match tool paradigm with organization

A development tool paradigm is the basic thought process used to create applications. How do YOU think? Do you conceptualize in granular sequential commands, or do you construct abstract business entities? Do you talk to users and prototype workflow processes, or do you create functional hierarchies with generalized operations? Talented developers may attribute much of their success to natural ability, but the truth is, it takes practice to become proficient at any paradigm.

Changing paradigms brings discontinuity to the development process, and discontinuities are expensive for any organization, for they necessitate considerable retraining. For example, if you are skilled at 3GL programming, it is much easier to adopt a new 3GL than to shift to a model-driven CASE paradigm. Making incremental changes in an existing paradigm is cost-effective; leaping from one paradigm to another is not. . . except when the application warrants it.

There are two kinds of costs of change: those of individual adoption and those of organizational adoption. Not only are costs higher when more people are involved in organization-wide paradigm shifts, so are the consequences of a mistake. It took vendors of development tools a generation to learn this: If the organization is not ready to invest in a paradigm shift, it will not adopt new tool technologies. And if it does adopt them, it will fail.

IDC has developed a taxonomy to classify some 200 tool vendors in 20 tool markets, based on what tools do, how they do it, how they are used, their abstraction level and breadth of functionality. It has little to do with application scale. For example, 3GLs

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can be used for almost any size application.

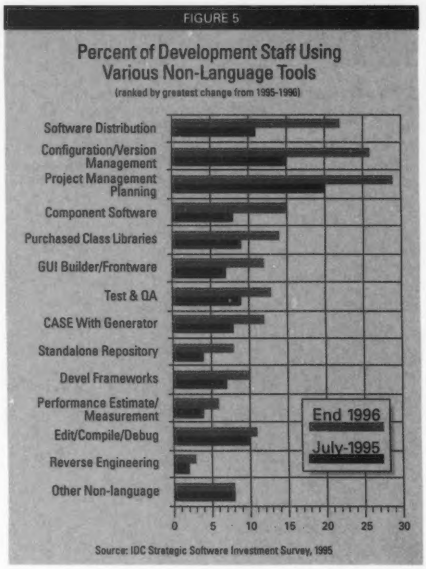
Tools for distributed development fall into five paradigms, each defined by a combination of functions, usage metaphors, lifetime productivity levels and price bands that together determine how cost-effective the paradigm will be for an organizations. Paradigms have as much to do with individual and organizational adoption as with whether the tool can do the job. Costly tools that require more training may be more cost-effective than simpler tools that result in a longer development cycle and more lifetime maintenance resources. The paradigms are:

- Classic 3GLs
- Visual 3GLs
- Classic 4GLs
- Visual 4GLs
- Integrated CASE

The list contains no specific object-oriented paradigm, because object-oriented development is a methodology for using the tools. Many of the tools have specific features to aid developers in defining and reusing classes and objects.

In the survey, development managers were asked which tools they purchased for client/server programmers. Their responses were classified according to these five paradigms. Respondents chose tool paradigms in this order: Visual 4GL, Visual 3GL, Classic 3GL, Classic 4GL and CASE.

FIGURE 5



3GL paradigm: least cost to adopt

The 3GL paradigm still dominates development, although instead of just Cobol, several different 3GLs are often used. Since 1990, Cobol has lost share to C due to C's popularity for programming midrange Unix servers. Now both languages are losing share to C++ for this function, although Cobol is retained for legacy maintenance.

Use of visual 3GLs, led by Visual Basic and Visual C++, is soaring. Visual 3GLs offer easy-to-learn GUI builders and rich sets of pre-built components, and are easy to adopt since they are only an incremental change from traditional syntax-driven and command-oriented 3GLs. They are used for simple client/server development and as a cost-effective way to re-engineer legacy applications to client/server.

4GLs: practical solution for mid-range OLTP

Traditional 4GLs were designed for larger and more complex development tasks. But suppliers enhanced these products' integration with leading DBMSs, creating the DBMS/4GL hybrid powerhouses that now dominate the tool marketplace.

Adopting these integrated 4GLs was only an incremental step for organizations, many of which already had 15 years of experience with relational DBMSs and more with host-based 4GLs. To integrate a client/server 4GL with an RDBMS was a relatively small step but a compelling proposition.

Originally, this integration came from vendors of DBMS-independent 4GLs, who touted their ability to develop applications that interfaced to multiple vendors' DBMSs. DBMS vendors' core competencies were in the database engines themselves, not the tools. Before 1994, their tools lacked a true 4GL paradigm with robust report generators and metadata repositories. But major DBMS vendors, such as Oracle, Sybase, Informix and Progress, have since improved their tools to the point where these tools can compete on their own.

In single DBMS environments, these DBMS-centric tools are often the most cost-effective for OLTP-

type applications. In multi-vendor DBMS environments, the cosmopolitan nature of the tools of the DBMS-independent vendors may provide an edge. Also, some DBMS-independent 4GLs offer more environment support for prototyping, complex logic support, decision support or transaction monitoring. One big concern: Business logic that is hard-

ASE may be about to enjoy a rebirth as a development paradigm.

coded into vendor-specific DBMS triggers and stored with the data schema is not transportable.

Most 4GLs have migrated to become visual 4GLs, meaning a developer can now create nearly an entire application by pointing and clicking on visual objects and icons. 4GL syntax is needed only for the more complex logic.

Integrated CASE: saved by complexity

CASE tools have languished for the past two years, because CASE has been organizationally hard to adopt. Vendors were late to generate code for the client part of client/server, and were slow to move CASE's server-based metadata repository off the mainframe and work out ways of managing the models, so teams could work effectively. The mainframe repository operating environment meant these tools carried a high price tag.

CASE vendors have addressed these issues. They now offer flexibility in usage metaphor: Users can do rapid prototyping, the tools generate a generous amount of "default code" and users are not confined to a strict methodology. Their tools have become more cost-effective due to more flexible and lower entry point pricing models, less learning time required due to greater usage flexibility, and functionality increases that truly offer platform-independent models for multi-tier distributed development.

Even though CASE tools still fall short in process tasks such as managing other tools' code and software distribution, they may be about to enjoy a rebirth as a development paradigm for the most complex distributed applications, for large-scale systems involving mainframes and as a means of generating data schemas for visual 3GLs.

Object-oriented methodology: different flavors

Eventually, we are all going to end up using object-oriented (OO) development tools, although how much a developer will have to consciously follow an OO methodology will depend on the tool's level of abstraction. Some developers will deliberately adopt OO tools and formalize a process based on a specific object methodology; others will be seduced into working with objects and learn about the methodology through component-based tools.

Effective use of object techniques demands a methodological focus as rigorous as any associated with CASE. This is because the productivity payoff comes with reuse of classes and associated methods. Reuse, however, requires that class designs be well thought out in a top-down manner, meaning an organization has to buy into the methodology as a whole. Developers are best relegated to complementary roles as class builders (using 3GL-like languages) or object assemblers (using higher-level graphical tools).

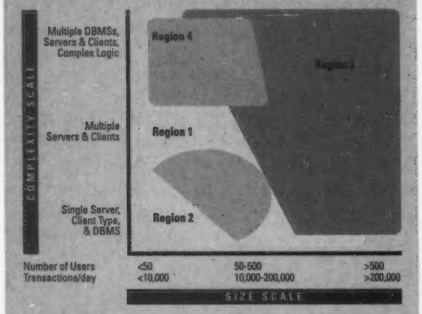
Object technologies have been widely adopted by software vendors, since it is in the survival manual of every vendor developer to be a visionary. But businesses, wary of making paradigm leaps, lag by at least three years.

Many tools, including visual 3GLs, visual 4GLs and CASE tools, claim to be object-based. However, true multilevel inheritance, polymorphism and encapsulation still elude object-based tools. Also, reusability of methods for large projects becomes impractical if there are no object librarians with the expertise to help one find appropriate objects and methods. Managing such object libraries to maximize reuse is still a challenge for object-oriented tools. Managing the distributed object environment is another challenge.

The pragmatist early majority will minimize their development risk by opting for an object-based tool as a transition tool, with the promise that the vendor will migrate the tool to true object orientation. This will suffice, as much of the other software needed to manage the distributed object environment is not yet in place. Object-based tools are a seductive way

FIGURE 6

Distributed Application Development Scalability



** Indicates object-oriented tool*

VENDOR/TOOL	PARADIGM	REGION
Andersen/FCS	CASE	3
Antares/ObjectStar*	Classic 4GL	3
Bachman-Cadre/Teamwork	CASE	4
Borland/C++*	Classic 3GL	1
Borland/Delphi*	Visual 3GL	2
Centerline/Object Center*	Classic 3GL	1
Cognos/Powerhouse	Classic 4GL	1
Cognos/Axiant*	Visual 4GL	1
Computer Associates/Visual Objects*	Visual 4GL	2
Computer Associates/Realizer	Classic 3GL	3
Compuware/Uniface	Visual 4GL	1
Dynamics Research/VisualMagic	Visual 3GL/CASE	1
Dynasty/Dynasty*	Classic 4GL	1
Forte/Forte*	Classic 4GL	1
Gupta/SQLWindows	Visual 4GL	2
HP/Distributed Smalltalk*	Classic 3GL	3, 4
IBM/Visual Age*	Visual 4GL	2
IBM/Visual Gen	Visual 4GL	2
Informix/New Era*	Visual 4GL	1
Inovmc/Passport*	Visual 4GL	1
Intellicorp/OMW*	CASE	4
Intersolv/APS for client/server	CASE	3
Micro Focus/COBOL	Classic 3GL	3
Microsoft/C++*	Classic 3GL	3
Micro Focus/Visual Object COBOL	3GL	3
Microsoft/Visual Basic*	Visual 3GL	2
Net Systems/NetStar	CASE	3
Next/NeXTStep*	Visual 3GL	4
Oracle/Designer 2000	CASE	1
Oracle/Power Objects	Visual 4GL	1
Oracle/Developer 2000	Visual 4GL	1
Progress/Progress	Classic 4GL	1
ParcPlace-Digitalk/Smalltalk*	Classic 3GL	1
Computer Associates/Visual Objects*	CASE	3
Rational/Rose*	CASE	1
Sapiens/Object Pool	CASE	3
SAS Institute	Classic 4GL	3
Silicon Graphics/FORTRAN 90	Classic 3GL	4
Sybase/PowerBuilder Enterprise	Visual 4GL	1
Sybase/PowerBuilder Desktop	Visual 4GL	2
SEER/HPS 5.3	CASE	3
Software AG/Natural	Classic 4GL	3
Sun/Java	Classic 3GL	2
Sun/Visual Workshop	Classic 3GL	1
Symantec/Enterprise Builder	Visual 4GL	2
Texas Instruments/Composer	CASE	3
Unify/Vision	Classic 4GL	1
USoft/USoft Developer	Classic 4GL	1
VMARK/Object Studio*	Classic 4GL	1

Source: IDC Strategic Software Investment Survey, 1995

to begin learning the basics of the technology.

A final note: Certain types of applications cannot be created cost-effectively without the use of object tools. Examples include complex networked data models (the bill of materials and assembly methods for an airplane), complex event-driven logic, technical applications (CAD/CAE) and location-transparent processing. In the distributed world of today, these applications are becoming more in demand.

Rapid application development

Prior to the advent of graphical client interface builders, building GUIs was extremely difficult. But visual RAD tools allow both 3GL and 4GL programmers to point-and-click their way through a GUI easily enough to involve users in a prototyping activity. This RAD exercise usually reveals valuable design information about the application workflow and/or the business rules. Visual 3GLs have window toolkits that facilitate varying degrees of complexity in the interface design. The best ones render the target client platform transparent to developers and have their own objects to process inter- and intra-screen navigation, to access data in various server environments, and to interface to program logic either locally or on remote devices.

But with RAD tools, scalability issues surface. Multi-tier transactions are difficult to generate without actual programming, which often involves complex logic that accesses data across several platforms and could trigger concurrent processes on multiple computers. At enterprises, scalability requirements are extending to the use of the same application design to target multiple tiers of servers and to dynamically switch processing in realtime based on application runtime criteria controlled by external application monitors. With RAD tools, this is only possible by resorting to the underlying code, which is often very non-RAD-like.

Development tool scalability

During tool selection, IDC recommends that customers first find the tool paradigm that fits the company culture. After appraising the scalability attributes of the intended distributed applications, you are now ready for Phase II: to use size and complexity mapping to narrow your choice further.

Fig. 6 includes both tool name and vendor name, since some vendors offer tools that support multiple scalability levels and apply to different paradigms. Tools are color-coded to indicate their paradigm and are placed on the scalability map to show where they are cost-effective. Any tool in the chart can be put in the other quadrants; the mapping is to position the "median" or mid-level cost-effective user.

The scalability map shows four regions, whose boundaries are defined by the overall centers of competence of present tools. Tools designed for simple applications for small numbers of users are in the lower left quadrant. Tools for the most complex applications for small to medium numbers of users are in the upper left. Tools for the largest scale with high complexity are in the upper right. Tools aimed at the "sweet spot" of the scalability spectrum, where most of the activity is in terms of numbers of sites and developers, are shown in the middle.

Chances are you will find more than one tool in the chart that matches either your current paradigm or the one you want to migrate to. Now the trial test begins. In such trials, the tools should be stretched in both directions to the fullest extent of the complexity and size scales relevant to you.

However, low-priced RAD tools are so inexpensive that serious trials are seldom undertaken. The decision instead revolves around the ease of use for building windows. Since many such tools are sold indirect, without the help of a field technician, it is up to the buyer to construct and conduct the trial. This effort usually costs more than the tool's price tag, often precluding a serious trial, especially to test size scalability. It may be that performance cannot be tested until application rollout. For risk-averse organizations, this is hardly a recipe for success.

Look before you leap!

Here are some final suggestions to help you navigate the tools labyrinth:

- Development managers should choose tools that not only fit their present or intended paradigm but that also suit their application scalability requirements.
- Evaluate your development paradigm now and design a transition plan for getting to object technologies. Consider transition tools in your selection space as a means of minimizing the risk and cost of changing paradigms.
- Consider the lifetime cost of development tools. You are already burdened by a Herculean maintenance task. Invest only in tools that raise the level of abstraction at which the application is maintained.
- Applications will become larger and more complex. Be "realistic" in your scalability estimates.
- Use scalability estimates to test-trial tools, even low-cost ones. Your tool license costs are trivial compared to the costs of maintenance or starting the project all over again.

On the way to objects

As you build distributed applications, your challenges will multiply. On the horizon is the formidable task of linking heterogeneous environments from different enterprises over a variety of intermittently connected communication networks, the Internet, Intranet and mobile users. To do this, you will need platform-independent applications that are distributed according to autonomous rules that define the criteria under which processing shifts among resources to optimize resource use and availability. These applications will be built with objects and maintained by continually changing individual objects and redeploying them in realtime. All objects will be capable of relating to any number of applications. In the distributed object world, individual applications lose their meaning.

No one in your enterprise may currently be thinking of distributed object environments, so you may think you're off the hook for now, and that such a totally integrated paradigm will remain the province of visionaries for the foreseeable future. But as soon as a comparative business advantage can be demonstrated, your line-of-business managers will be asking how long it will take to implement a similar type of application. Soon after, software vendors will figure out how to minimize the risk and lower the cost of the paradigm shift. Tools will be offered. Now you are *on* the hook. The world of distributed objects will be here sooner than you think. ■

If you exclude

object technology is quite beneficial.

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Add-on stamps Mail as groupware

Offers low-cost alternative to Exchange Server

By Tim Ouellette

Groupware features without the groupware headache.

That's what users of Microsoft Corp.'s Mail messaging software can get with Conference +2.0 from Mesa Group, Inc. The Mail add-on uses that product's electronic-mail infrastructure to provide group discussions, document sharing, distributed applications and electronic forms.

Conference +2.0 appears in the Microsoft Mail environment as a set of folders and menu items. Version 2.0 has added full-text searching throughout conference databases, custom views and remote user support (see chart).

Without Conference +2.0, "if you want to extend Microsoft Mail with groupware features, you are sort of stuck. You have to wait for Exchange, then move over to Windows NT and do God knows what to your systems environment," said Geoffrey Bock, an analyst at Patricia Seybold Group in Boston.

Exchange Server is Microsoft's client/server messaging upgrade to Mail that promises to incorporate some groupware features. Observers said migrating to Exchange will require expensive infrastructure changes such as switching to Windows NT servers and upgrading desktop PCs. Some users who are happy with their Mail installation may not want to fork over that money right now.

Mesa not on a plateau

Conference +2.0 provides the following groupware features that run over users' existing Microsoft Mail network:

- Discussion folders, document sharing and electronic forms
- Custom conference folder views and subfolder groupings
- MAPI 1.0 object store that supports OLE objects, controls and attachments
- Support for Visual Basic, C++ and electronic forms applications
- Bidirectional replication, so changes can be moved among discussion folders

Pricing for Conference +2.0 ranges from $25 to $75 per user, depending on the number of seats.

Tony Munos, senior LAN engineer at LCI International, Inc. in McLean, Va., said his firm's human resources department had checked out Lotus Notes to create a job posting application. But the long-distance telephone-service provider already had 1,700 Mail users, so Munos wrote a few applications in Microsoft's Visual Basic and C++ that would run with Conference +2.0 to provide the same features in Mail as in Notes.

Smoothing migrations

For the many Mail sites that eventually will migrate to Exchange, Conference +2.0 will help the two environments coexist, since the software also runs with the Exchange client. Munos said LCI plans to do that by switching to NT Server and moving to Exchange in the next year.

Newton, Mass.-based Mesa also sells software to link Notes databases and Internet newsgroups with Conference +2.0 folders.

Forms automation sees future on 'net

By Stewart Deck

Bank of Boston's chief financial officer was tired of signing travel vouchers. Day after day, another stack of papers landed on his desk requiring his signature. Finally, enough was enough.

"He passed a mandate saying that he didn't want to see another paper voucher," said Bob Nowak, director of systems integration at Bank of Boston. "We have a total of about 77,000 [travel and entertainment] forms a year, and we had to put in place a system that automates the whole travel and reimbursement forms process."

Form-fitting

Bank of Boston estimates it will save each year 77,000 sheets of paper, equivalent to 14 miles of pages. Other benefits of electronic forms include the following:

- Elimination of redundant data entry
- Automatic calculations
- Quick forms turnaround
- No revalidation of data required
- Saved trees

Bank of Boston turned to JetForm Corp. in Falls Church, Va. The company's Filler 4.2 software lets users access the most up-to-date forms from Internet and intranet servers.

The latest release of JetForm Filler, which starts at $80, includes support for Netscape Communications Corp.'s Client Plug-In application programming interface. This lets users view, edit, save and route forms from within Netscape Navigator. Users can send data from the forms to a World Wide Web collection site for processing and analysis.

In Bank of Boston's case, travelers fill out their travel vouchers on-line and send their receipts with a tracer number to the accounting department. The electronic voucher is sent via electronic mail to a manager, who approves it and sends the voucher to the accounting department to be matched with the receipts.

Nowak said it takes a week to complete the process, three weeks less than the bank's paper-based systems.

The process is also linked to the company's database of travel-related information to discover useful company travel trends.

"This kind of forms automation software is going to play a critical role in enabling commerce over the Internet," said Gerry Murray, an analyst at International Data Corp. in Framingham, Mass. "This technology allows transactions to take place much faster and at a much lower cost to catalog providers," he said.

For example, an electronic order form can go to processing, billing and inventory all at once.

POEMS: Ode to open systems

Platinum's framework unifies systems management tools

By Bob Francis

Platinum Technology, Inc. is sending its open systems users a framework to link its products under one systems management umbrella.

The Platinum Open Enterprise Management System (POEMS) will offer a distributed management system for Platinum's database development, database administration and systems management tools. The POEMS Enterprise Console, now in beta testing, lets users manage all these kinds of tools from one console.

Platinum, in Oakbrook Terrace, Ill., later this year will offer integrated security services and event-management software, which monitors system events and automates message traffic, as part of POEMS. Other software, such as performance management, software distribution, job management, problem resolution, storage management and enterprise automation, will arrive piecemeal after that, company officials said.

Buying binge

Platinum has "been on an acquisition binge, and this tells customers that they're going to tie these pieces together," said Paul Mason, an analyst at International Data Corp. in Framingham, Mass.

POEMS won't change any of Platinum's tools but will superimpose object repository, file transfer and event-trigger messaging technologies on top of the applications, company officials said.

Platinum's addition of a console framework puts the company in closer competition with other open systems management tools such as Computer Associates International, Inc.'s CA-Unicenter and Tivoli Systems, Inc.'s TME Framework.

Platinum's acquisition binge shows no signs of slowing down.

Earlier this year, the company purchased Prodea Software Corp. in Eden Prairie, Minn., which makes on-line transaction processing tools. Another recent Platinum conquest was Advanced Systems Technologies, Inc./Distributed Computing Group in Boulder, Colo., and its client/server transaction management software. Those two acquisitions are Platinum's 26th and 27th in the past three years.

AIG signs with Sybase in bid to stay ahead

CONTINUED FROM PAGE 51

week, policies quoted but not yet committed to and other mainframe-based information that bears directly on the bottom line.

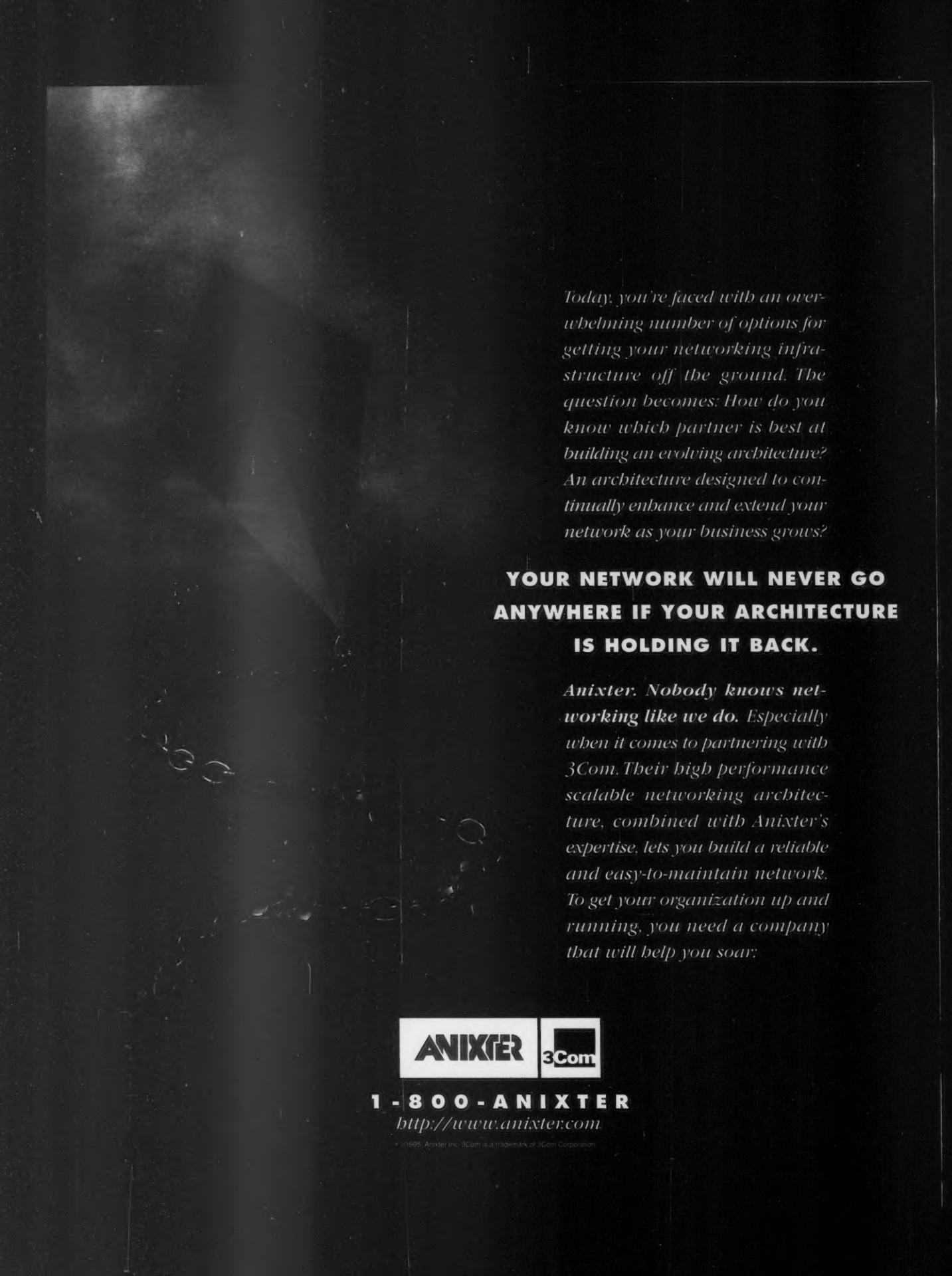
With the new system, end users — from company presidents to underwriters — will be able to get "whatever information they want, right away, themselves," said Jeff Stoll, senior vice president at AIG Data Center, Inc.

AIG is looking to Powersoft Corp.'s PowerBuilder and tools from Cognos Corp. to cut application development time. "That means users get their needs met sooner," Stoll said. In turn, they can put new products on the market faster.

Sybase's SQL Server relational database management system will be used to create data warehouses, into which mainframe data periodically will be copied. User queries will run against SQL Server databases from Windows applications.

Popolano and Stoll say the contract was awarded to Sybase — competitors reportedly included Oracle Corp. — as much on the basis of business philosophy as technology prowess.

"Vendors play leapfrog with technology, but openness to new ideas, corporate culture, vision and approach to doing business are more fixed, and we felt Sybase's were more in tune with ours," Stoll said.



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Windows NT network security, 64

The Enterprise Network

ATM users seek integrated management

Cabletron, Fore Systems improve Spectrum, ForeView links

By Patrick Dryden

Network management

Some early ATM users said they need to manage these high-speed, switched circuits with the same tools they apply to the rest of their network devices. And Cabletron Systems, Inc. and Fore Systems, Inc. told *Computerworld* they plan to improve this capability next month.

That's when Cabletron will release Version 4.0 of its Spectrum network management platform and associated tools. Then administrators will be able to launch an enhanced version of Fore's ForeView ATM element manager from Cabletron's overhauled ATM module.

Launching the ForeView element manager from inside the Cabletron module offers users more ways to control and evaluate ATM gear from the two Asynchronous Transfer Mode (ATM) partners. Also, Spectrum will now handle alarms and correlate events from both the ATM circuits and other network components.

To do this now, some Spectrum users have figured out how to bolt ForeView onto the platform. These users said they are eager to get better integrated ATM support.

"Managing our 155M bit/sec. ATM backbone should just require one more plug-in module," said Barbara Maaskant, director of information services at the Emory University School of Public Health in Atlanta.

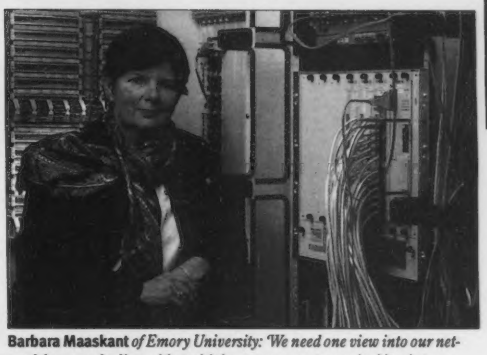
The school's network operators launch ForeView from Spectrum 3.1 to configure and analyze an ATM backbone that links 10 floors. Then Spectrum incorporates these ATM switch elements in its database to help operators monitor network relationships.

Simpler is better

Relying on ForeView is fine as long as the tool does its job and works easily, Maaskant said, "but we would rather have a single console entirely."

Cabletron covers ATM management needs through its module for Spectrum, but some users prefer ForeView for device-level tasks.

"I prefer ForeView over the Cabletron module for ATM administration and so look forward to seeing it fully integrated into Spectrum in one to two months," said John Avallone, a telecommunications service analyst at the Lucent Technologies subsidiary of AT&T Bell Labs in Murray Hills, N.J.



Barbara Maaskant *of Emory University: 'We need one view into our network because dealing with multiple management consoles bites into my resources'*

ForeView soon will appear more seamless to Spectrum operators and add new capabilities, according to officials at Cabletron in Rochester, N.H., and at Fore in Warrendale, Pa.

Two views

For example, customized screen displays will match Spectrum's presentation of the connection paths that carry ATM traffic. Also, an operator will be able to see both Spectrum's logical view of ATM network interfaces and Fore's physical view.

Installing this combination won't require expertise in adapting applications within Spectrum, and ForeView will hook into Cabletron's ATM module to take full advantage of Spectrum modeling, according to officials.

"Certainly a single platform for managing all network elements is desirable," said John Scoggin, a technical consultant at Delmarva Power & Light's Co. advanced technologies group in Newark, Del. "ForeView will be just another window to pop up."

Scoggin said he needs ATM support through Spectrum to prototype a test network, where an ATM server backbone will link application and database servers that support nearly 1,400 users.

Through the Fore/Cabletron integration effort, operators should be able to monitor these ATM circuits and SAP AG R/3 applications, along with 11,000 managed objects throughout Delmarva's network, around the clock, he said.

Citrix offers alternative dial-up access

By Stuart J. Johnston

When the Olympic Games come to Atlanta this summer, city officials will have a message for residents who work downtown: Don't even think about going to work.

During the three weeks of athletic competition, many Atlanta workers will be sitting at a desk at home, linked to their offices by modem.

That also creates a dilemma: How do you give remote users access to local client/server and legacy applications without spending a fortune and still provide performance that is nearly as good as being on the LAN?

Some Atlanta companies will opt for Citrix Systems, Inc.'s WinFrame/Access multiuser application server for dial-up computing.

"In the past, I've said you can't run legacy systems across phone lines. It can't be done," said Wes Barlow, an operations and LAN manager at Creditor Resources, Inc., an insurance company in Atlanta. WinFrame/Access offers users "acceptable" performance when they remotely access the company's Borland International, Inc. Paradox database, which runs on the LAN, he said.

WinFrame/Access lets remote users run a simple client on their PCs, which lets them connect to a Microsoft Corp. Windows NT Server box that runs users' individual Windows applications sessions locally. Only keystrokes, mouse events and screen changes go over the telephone line, so performance is nearly as good as being there, according to five users.

Faster than ISDN

One user tried running databases across Integrated Services Digital Network (ISDN) lines, which offer 128K bit/sec. bandwidth. Even with 5-to-1 compression, performance was really slow, said Mark Marcus, director of new technologies at Imonics Corp., a systems integrator in Atlanta. He said using WinFrame/Access was a lot faster, even with 14.4K bit/sec. modems.

Citrix in Coral Springs, Fla., recently started to ship the package, which costs $2,995 and includes a copy of Windows NT Server and 10 user licenses.

WinFrame/Access lets remote users run Microsoft's Windows 95, Windows 3.1, MS-DOS and Windows NT client sessions on NT Server, which communicates by using Citrix's specially developed communications protocol.

The server package requires a 486- or Intel Corp. Pentium-class

Citrix, *page 66*

Benefits of using Citrix WinFrame/Access

- **Economical dial-up access** – Multiple users can run on a single communications server
- **Simplified application management** – Windows applications run on the server so they don't have to be transferred to each client
- **Thin client** – Users' client software runs on 640K bytes (2M bytes recommended)
- **Extends PC's life** – A 286-based client PC can run 32-bit applications because the code executes on the server, not on the client
- **Remote administration** Administrators can dial in to perform tasks
- **C2 compliant security** – WinFrame/Access comes with Windows NT Server and uses NT's security
- **Network integration** – Will work with networks running Windows NT and NetWare

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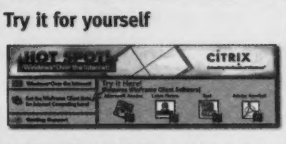
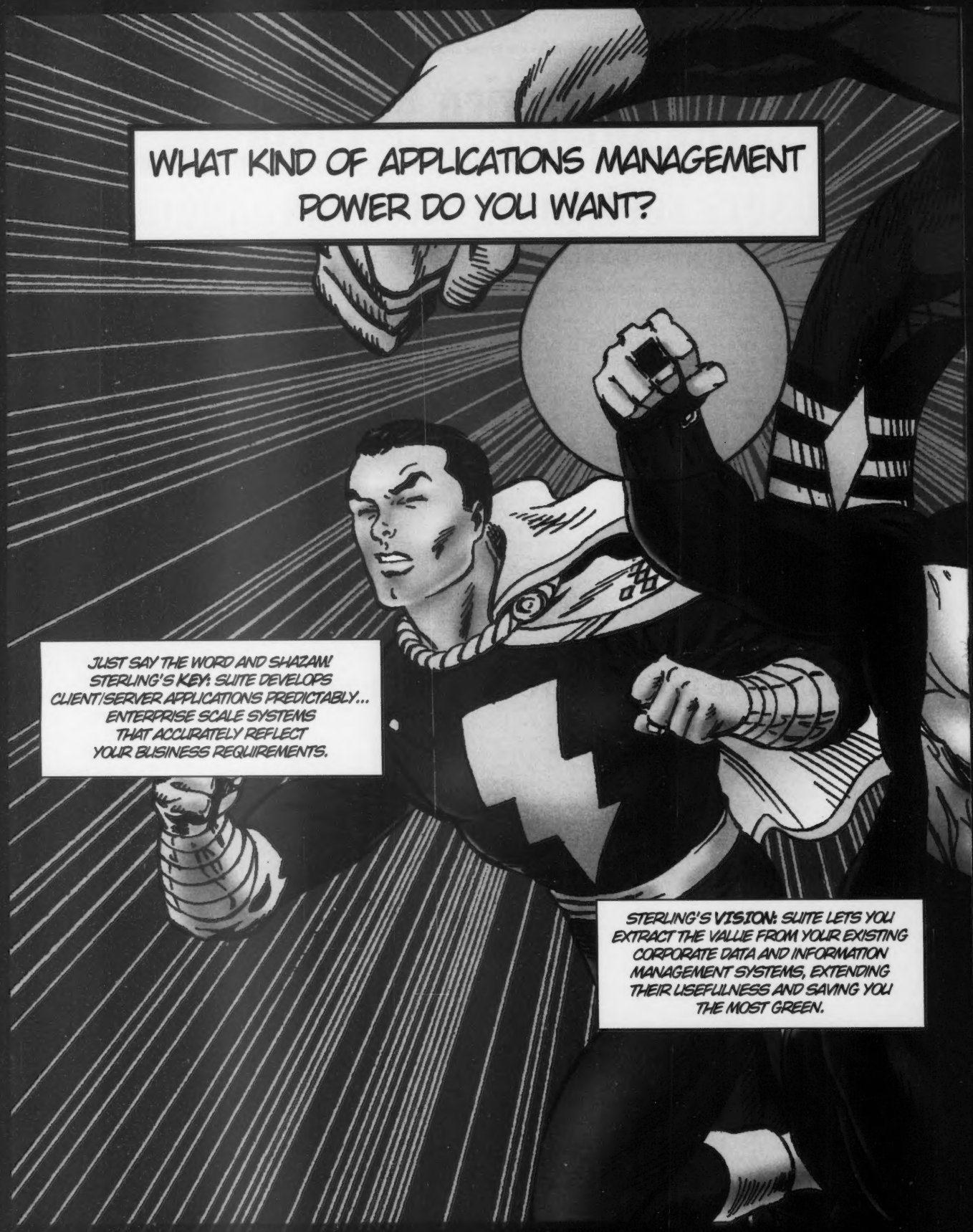


Visit **http://www.citrix/hotspot.com** to download WinFrame Client software and sample Access via the Internet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Banyan aims to spin Web into Vines

By Tim Ouellette

Banyan Systems, Inc. wants to make it easier for Vines network users to access the Internet and exploit some of Windows NT's capabilities.

At the recent Association of Banyan Users International conference in Chicago, the Westboro, Mass., networking company announced a development agreement with Incognito Software, Inc. in Vancouver, British Columbia. Incognito will integrate World Wide Web and Internet services seamlessly with Vines networks. Companies can keep their Vines servers and have Web access.

Banyan also announced an alliance with Attachmate Corp. in Bellevue, Wash., to provide remote access to Vines networks via Attachmate's Remote LAN Node software.

Banyan will replace its own CommServer enterprise gateway with Attachmate's Windows NT-based TCP server. This will give Vines users the option of using either Vines or TCP/IP.

Banyan also is catering to the many Vines users who run Microsoft Corp.'s Windows NT. Banyan announced StreetTalk Access for Windows NT File and Print Services and plans to develop an NT-native version of StreetTalk. StreetTalk Access lets users access the file and printing features of NT via the StreetTalk directory.

"Banyan really reinforced that their direction is Vines and services on NT," said Jim Becker, president of PhilaBUG, the Philadelphia Banyan Users Group. That focus may leave some Unix customers feeling left out, however, he added.

"The vast majority of our users already have NT in their network," said Jeffrey Bernard, director of enterprise marketing at Banyan. "We want to pull critical pieces of NT into the Vines network."

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Briefs

HP targets NT, NetWare management

Hewlett-Packard Co. outlined new management options for networks based on Microsoft Corp.'s Windows NT and Novell, Inc.'s NetWare. The OpenView platform and its components for network and systems management can better address users' needs now that HP has coordinated once-separate product groups.

IBM to add Notes link to middleware

IBM late this month will add a Notes link to the version of its MQSeries messaging middleware that runs on Hewlett-Packard Co.'s HP-UX operating system. The link, which lets desktop Notes users connect to back-end transaction servers through MQSeries, is already available on IBM's AIX and OS/2 platforms. The HP-UX release of MQSeries will also support the latest versions of that operating system. Shipments start on March 29.

Wireless travel info

Wireless network developer **Geotek Communications, Inc.** in Montvale, N.J., has reached an agreement to deliver traveler information via SmartRoute Systems in Cambridge, Mass. The information will be delivered over Geotek's digital wireless networks. The services will be aimed at commercial vehicle operators with dispatch operations. They will be offered in Boston in April and will then be expanded to other cities with Geotek networks.

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Windows NT network users get more security

Security Dynamics package requires log-in and password authentication

By Laura DiDio

A new software package secures Windows NT Workstation and NT Server-based networks for local and remote users. Users and analysts said it is one of the first such products for the Windows NT environment.

ACE/Client 2.0 from Security Dynamics, Inc. (SDI) gives users of Microsoft Corp.'s Windows NT Server and Windows NT Workstation two levels of log-in and password authentication to help ensure secure local and remote network access.

ACE/Client 2.0 for Windows NT works with SDI's ACE/Server software and SecurID token-security products, said Eric Ogren, a product line manager at SDI in Cambridge, Mass. ACE/Server is SDI's flagship security offering. It runs on industry-standard Unix platforms such as Sun Microsystems, Inc.'s Sun OS, IBM's AIX and Hewlett-Packard Co.'s HP-UX.

Network management

The combination of ACE/Server, ACE/Client and the SecurID token component is like an employee badge. Users enter a six-digit personal identification number each time they access the network; a light-emitting diode device (about the size of a credit card) displays an access code that lets users log on.

The technology provides more of an impediment to would-be hackers because the access code automatically changes every minute.

This type of functionality is important to early users such as Kim Takayama, a network manager at American Cyanamid Agricultural Research Center in Princeton, N.J. The center is increasing the number of remote users who access the network, Takayama said.

"The ACE/Server and Client software has worked wonderfully for us," Takayama said. "Used with the SecurID token, it's very tough for anyone to get on the network and compromise security."

Takayama said he also likes that SDI's ACE/Server and ACE/Client software lets end users and network administrators use standard Windows NT Workstation and Server commands and management utilities when they log in. This means American Cyanamid's administrative tasks can be performed via NT's User Manager and Event Viewer utilities.

"It's a very smooth integration and a very practical one. Our administrators don't have to learn a different set of security commands," Takayama said.

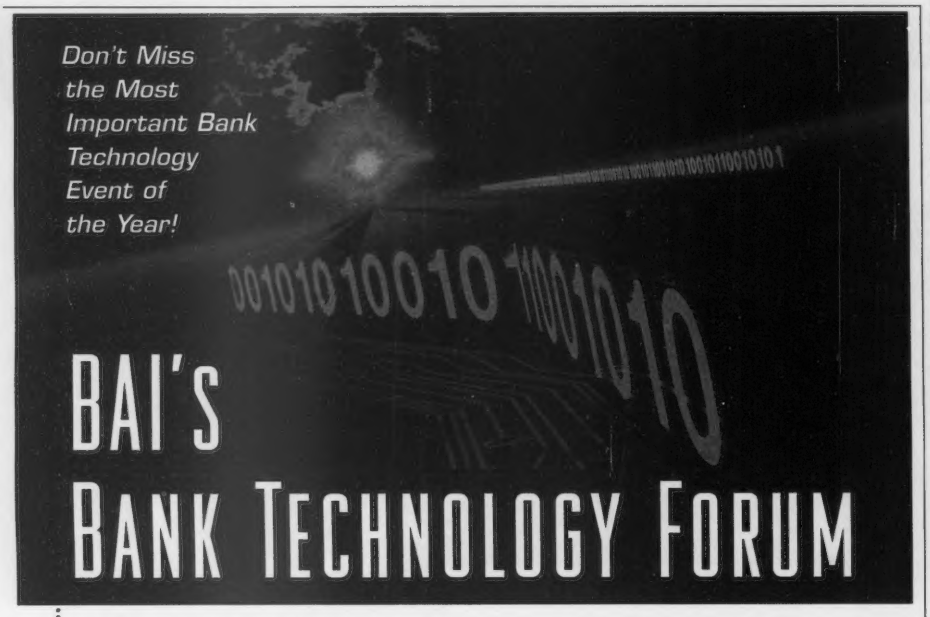
Besides authenticating the user's identity, the ACE/Server and ACE/Client packages give administrators an audit trail that records all access attempts.

Michael Howard, president of Infonetics, Inc., a San Jose, Calif., consulting firm, said SDI's ACE/Client software leads the pack in providing advanced authentication for Windows NT. In the past, Howard said, one of the biggest obstacles for users who wanted to implement security was the high price per seat.

"It wasn't unusual for security software to cost twice the price of the PC. But at under $150, the ACE/Client for Windows NT is very cost-effective and one of the more reliable products I've seen," Howard said.

ACE/Client costs $149 per PC; ACE/Server pricing starts at $2,450. The SecurID token starts at $34 per client token.

Dilbert



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Pan-European data network OK'd

Hermes, to start midyear, will use railway cable infrastructure

By Elizabeth de Bony
BRUSSELS

The European Commission recently approved Hermes, the joint venture for a pan-European network dedicated to cross-border data traffic that primarily uses railway cable infrastructure.

The advantage to users is convenience: Instead of having to negotiate with the telephone provider in each European Commission country, they can deal with one source for data needs across borders.

Hermes is an alliance of GTS Hermes, Inc., 10 European national railways and Racal-BR Telecommunications Ltd. (Racal-BRT). It aims to be a carrier's carrier, used by public network operators, carrier consortia, cellular telephone companies and other authorized telecommunications operators, according to the European Commission.

Cross-border appeal

Hermes should also appeal to large European companies with cross-border communications needs, said Rob Ollerenshaw, an analyst at CIT Research Ltd., a market researcher in London.

The pan-European network will start operations midyear. That's when the member states are required to end all national restrictions on the freedom of alternative infrastructure operators to supply services such as data transmission.

European legislation approved earlier this year set July 1 as the deadline for member-state compliance.

The European Commission believes Hermes may grab a large share of the market for pan-European data transport networks. But it will face powerful competition — such as the current national telecommunications operators.

GTS Hermes, Inc. supplies value-added telecommunications services; Racal-BRT supplies business and operational telecommunications services to the British Railways Board.

GTS Hermes is a subsidiary of the Global TeleSystems Group in the U.S., and Racal-BRT is a subsidiary of the U.K.'s Racal Electronics group.

Within the European Union, all national railway undertakings, except those from Portugal, Ireland, Luxembourg, Greece and Finland, are participating. The Swiss national railway is also part of the venture.

De Bony is an IDG News Service correspondent in Brussels. Joanne Taaffe in the News Service's Paris bureau contributed to this story.

Citrix

CONTINUED FROM PAGE 59

server with 16M bytes of RAM for the basic system and server software, and between 4M and 8M bytes of RAM per concurrent user session on the server. The client software requires at least 640K bytes of RAM on the end user's PC; 2M bytes are recommended.

Lower costs vis-a-vis other options, such as Symantec Corp.'s PC Anywhere, are also a factor in information technology managers' choice of Citrix.

"With PC Anywhere, you have to pay a license fee for every user who has a copy of the client software, plus you have to have a dedicated machine for each user who dials in," said Cortne Pappas, an account manager at National Business Group Reseller, a large systems integrator in Atlanta. "A single WinFrame/Access server can support 55 concurrent users," he added.

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New Products

Smart Storage, Inc. has introduced SmartCD Archive NetWare Loadable Module (NLM) 1.51 software.

According to the Andover, Mass., company, SmartCD NLM 1.51 software lets users access data stored on CD-recordable media. It provides native access to CDs by presenting the CD storage structure as a mountable Novell, Inc. volume.

Administrative tasks such as changing CDs and configuring devices are performed via a menu-driven interface or from the command line.

Users can view CDs on the system as a single volume or individually with a volume that corresponds to each disc.

SmartCD Archive NLM 1.51 is device-independent. It lets users add and mix SCSI CD readers and jukeboxes in one modifiable storage structure.

Pricing for SmartCD Archive NLM 1.51 starts at $495 and is based on specific devices in the CD storage structure.

▶ *Smart Storage*
(508) 623-3300

Optical Data Systems, Inc. has unveiled Micro-Infinity Plus, a switching hub for Ethernet and Token Ring LANs.

According to the Richardson, Texas, company, Micro-Infinity Plus has 10 slots for Ethernet or Token Ring modules that support up to 180 Ethernet or 160 Token Ring users on one hub. It was designed for midsize workgroups on different floors of a building or remote sites connected by a high-speed backbone.

Pricing for Micro-Infinity Plus starts at $5,080.

▶ *Optical Data Systems*
(214) 301-3811

Syrius Research, Inc. has introduced RouteOne, an electronic-mail application.

According to the Los Angeles company, RouteOne is a workflow routing system. It integrates with Microsoft Corp.'s Mail, Lotus Development Corp.'s CC:Mail and Novell, Inc.'s GroupWise.

It was designed to integrate with PC DOCS, Inc.'s PC DOCS Open for retrieval and management of routed documents. RouteOne gives E-mail users immediate access to documents for review, modification and distribution.

RouteOne lets users watch the routing sequence of messages and document receipts and requested actions. It lets users change routing sequences, add or delete recipients, cancel routing actions and delete documents at any point in the process.

RouteOne's pricing starts at $89 per user.

▶ *Syrius Research*
(310) 643-4550

CheckPoint Software Technologies, Ltd. has announced CheckPoint FireWall SecuRemote, client encryption software.

According to the Redwood City, Calif., company, CheckPoint FireWall SecuRemote enables secure, private communications by mobile and remote users through dial-up connections on the Internet. The product encrypts data before it leaves the laptop and provides a client-to-firewall connection. When the data reaches the gateway, FireWall software decrypts the data and sends it to its destination in the network.

CheckPoint FireWall SecuRemote features support for dynamic Internet protocol addressing and includes public-key technology for user authentication.

CheckPoint FireWall SecuRemote works with CheckPoint's FireWall-1 Internet gateway software on Sun Microsystems, Inc.'s SunOS and Solaris, Hewlett-Packard Co.'s HP-UX and Microsoft Corp.'s Windows NT. Pricing will be announced in June.

▶ *CheckPoint Software Technologies*
(415) 562-0400

Stampede Technologies, Inc. has announced Remote Office Gold 3.0, a mobile communications product.

According to the Dayton, Ohio, company, Remote Office Gold 3.0 lets mobile users run IP and IPX simultaneously, so users can access office resources and use a network's Internet access through TCP/IP in one telephone call. It includes docking station support, corporate security features and dual-mode modem support.

Pricing for Remote Office Gold 3.0 starts at $1,095 for an eight-port version.

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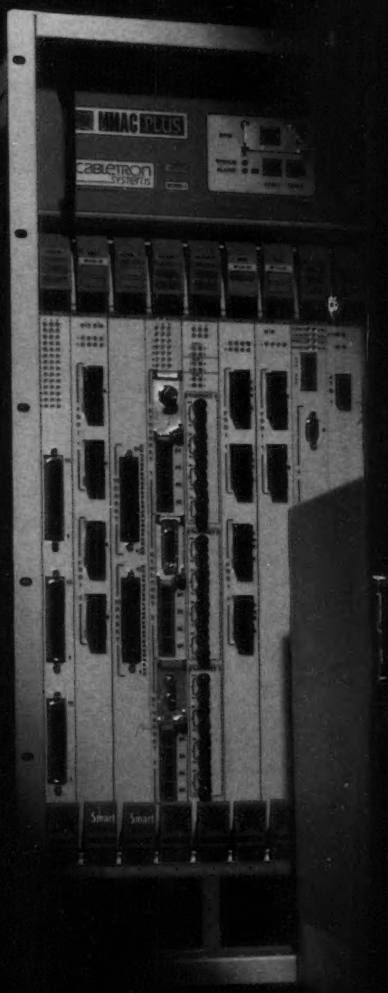

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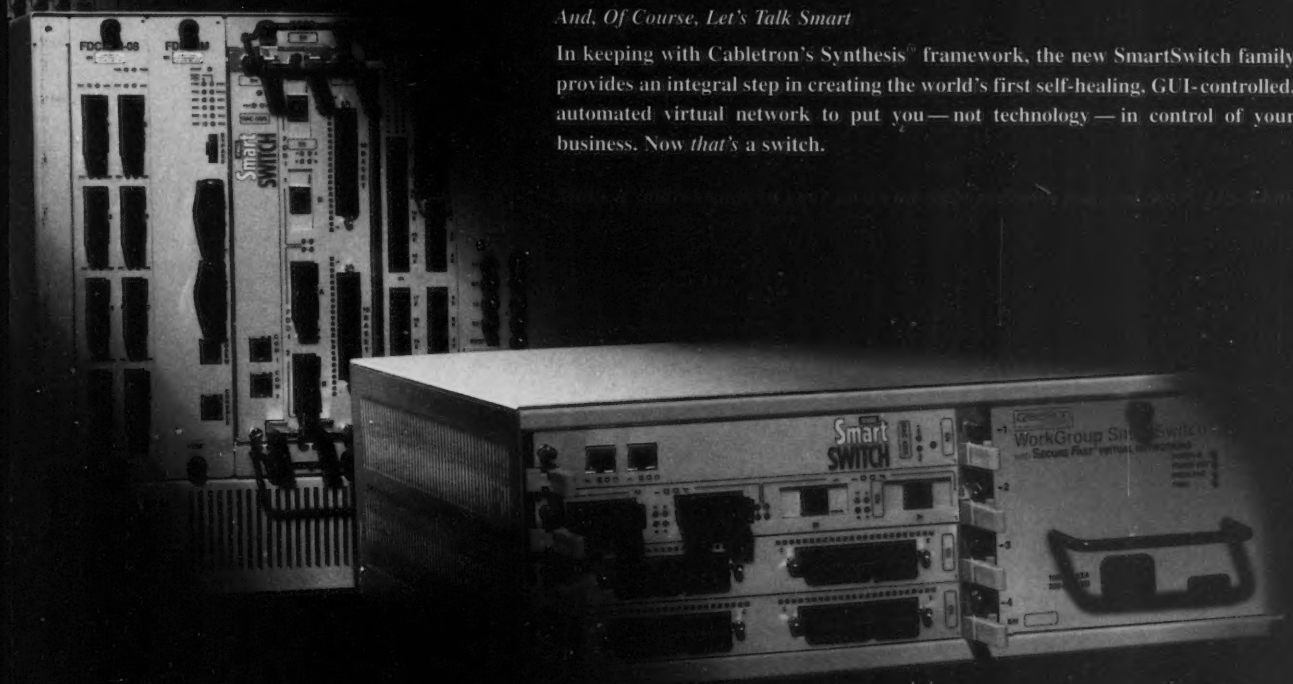

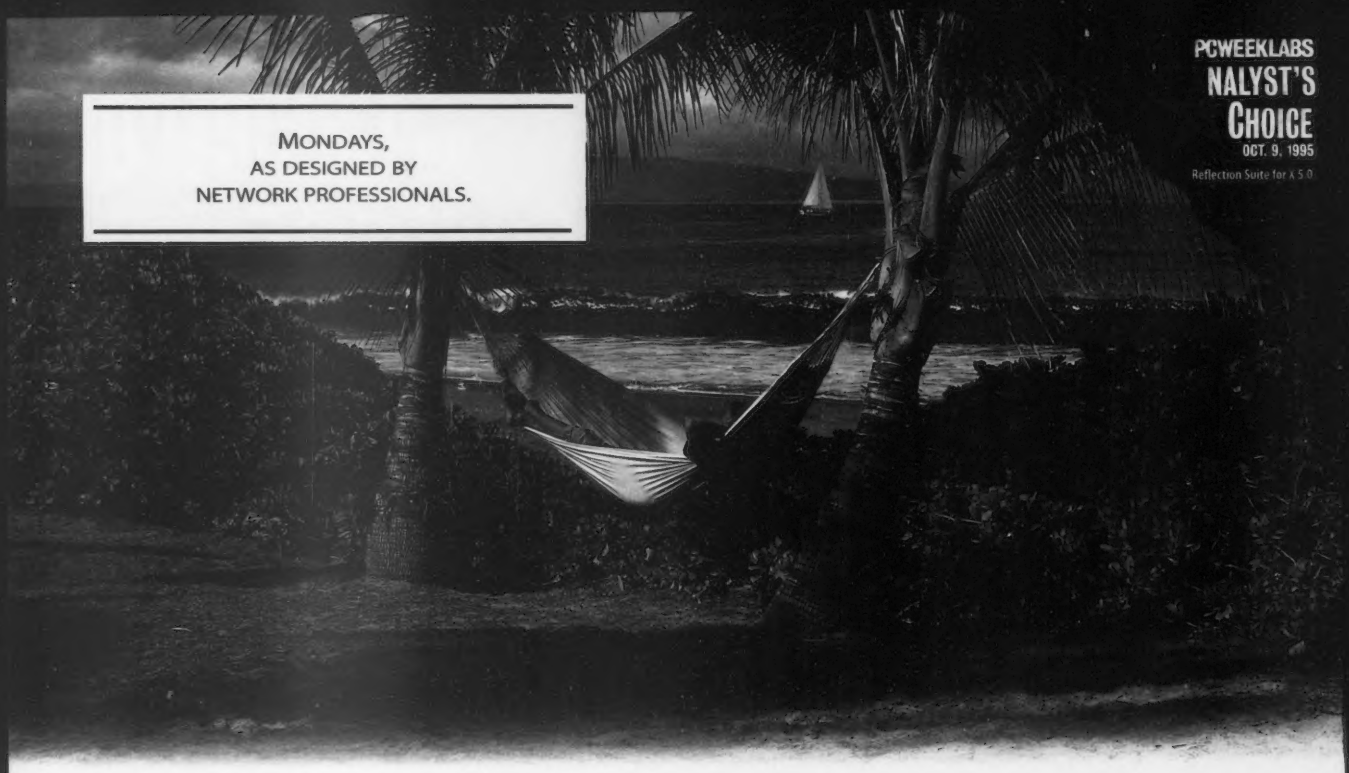

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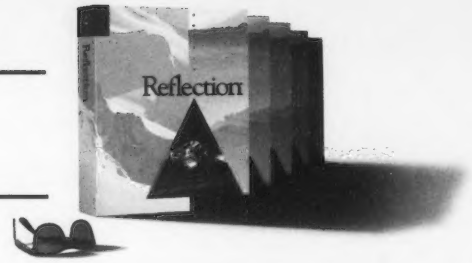

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Hitachi brings personal touch to Web browers, 74

The Internet

On-line services buzz with deals and debuts

By Mitch Wagner

The on-line services industry was chockfull of activity, confusing plot twists and intrigue earlier this month.

In about a dozen announcements over a three-day period, CompuServe, Inc. and America Online, Inc. announced alliances with Microsoft Corp., Netscape Communications Corp. and other vendors. All the deals were designed to beef up the proprietary on-line services' access to the Internet and attract more consumers.

For businesses trying to market their goods and services on the Internet, this was good news because on-line services such as AOL and CompuServe can bring millions of consumers to the Internet (see chart).

Among the deals, AOL upgraded its Internet browser offerings and announced a plan to license the Java programming language from Sun Microsystems, Inc.

"This is great," said Eric Goldreyer, president of Inns & Outs, Inc., an Austin, Texas-based publisher of an Internet guide to bed-and-breakfast inns.

"It means AOL and the proprietary networks are getting it in gear, with browsers that will support functionality that users are interested in. Our site uses frames technology and Java applets, and, frankly, if you come to the site via AOL currently, it's not going to look that good," he said.

Changing fancy

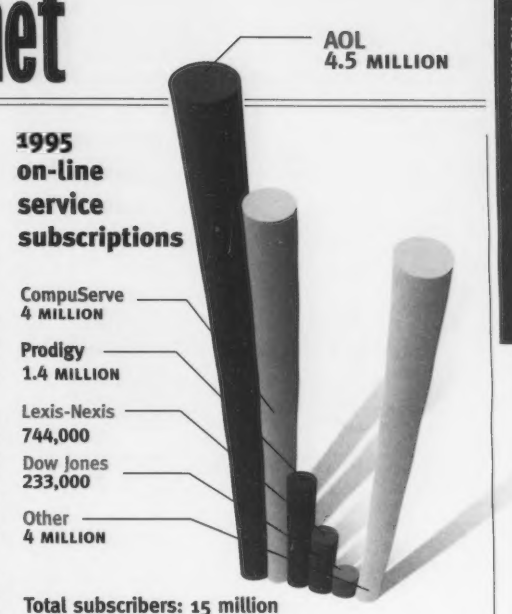
America Online, based in Vienna, Va., said March 11 that it will offer the Netscape Navigator browser as a replacement to the inferior World Wide Web browser now offered with AOL. A day later, the company snubbed Netscape and announced that Microsoft's Internet Explorer will be the primary browser for AOL, with Netscape Navigator available only as an option.

Microsoft, meanwhile, said it will bundle AOL access with the Windows 95 operating system and make the AOL icon available from the Windows 95 desktop — alongside the icon to launch The Microsoft Network.

Furthermore, America Online announced that both Netscape and Microsoft have licensed compression technology designed to work on both audio and video on-line traffic. That means users might one day be able to use a single software package for audio and video on the Internet, rather than the current confusing array of incompatible software packages that handle video or audio but not both.

CompuServe, based in Columbus, Ohio, has been active, too. It recently announced a deal with Netscape not only to offer the Navigator browser, but also to make custom versions of the browser available for corporate customers.

CompuServe already provides intranet, networking and electronic-mail services for more than 900 corporations. Under the terms of the Netscape deal, those users will be able to customize the Netscape browser to point toward specific, preset Internet or intranet sites. Corporate users also will be able to redesign the browser to display their corporate logo.



Source: Simba Information, Inc., Wilton, Conn.

Search tools help lost users find 'net resources

By Kim S. Nash

No one knows how much data is on the Internet.

Likewise, the average end user of an intranet probably needs some help figuring out exactly what information is on the internal company network.

As companies build intranet applications for processing data that is more complex than simple telephone directories or lists of health benefits, the need for search tools is becoming critical. A lack of an easy means to find important information could even nix a company's intranet plans altogether, some observers said.

Rescue party on the way

Lost users aren't happy users, said Gordon Benett, a lead consultant at Techne Group.

"Finding a needle of value in the corporate haystack is the central problem," Benett said. Techne Group, a World Wide Web consulting company in Waltham, Mass., is building an intranet for a large New England utility. Part of the project is thinking through a search-engine strategy.

Techne relies mostly on free products downloaded from the Internet such as Glimpse and Harvest. However, new Web servers from Netscape Communications Corp. and Microsoft Corp. could change that, Benett said.

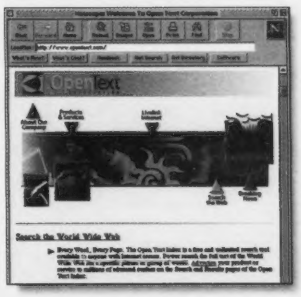
Microsoft's Internet Information Server and Netscape's Enterprise Server both contain search mechanisms. For example, Netscape users are due to get search capabilities in two ways next month. One is a new $995 search engine called Catalog Server; the other consists of built-in search functions in Enterprise Server 2.0, also priced at $995.

"This is extremely good news. What good is information if you can't find it?" asked Tamas Doszkocs, a computer scientist at the National Library of Medicine in

Search tools, *page 74*

Where on the Web?

OpenText has started to market a search engine to intranet users. These other vendors have also begun to target IS:



- **America Online** http://www.webcrawler.com/
- **Digital Equipment** http://www.altavista.digital.com
- **Lycos** http://www.lycos.com/
- **OpenText** http://www.opentext.com
- **Yahoo** http://www.yahoo.com

Web server helps users manage, track site data

By Mitch Wagner

Pacific Coast Software plans later this month to announce a database server for the World Wide Web, along with several other tools webmasters can add to their site maintenance Swiss Army knives.

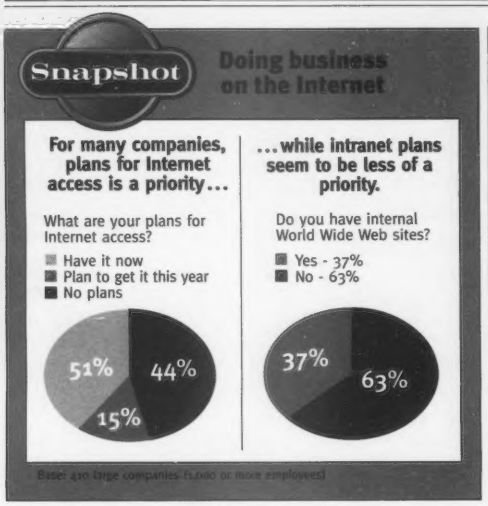
WebCatalog stores data in its own database. In response to queries from visitors to a site, WebCatalog generates pages on the fly and displays them immediately.

Fast choice

Matthew Steele, vice president of systems development at Paper Site in San Francisco, said he chose WebCatalog over software from Sybase, Inc. and Oracle Corp. Paper Site is a San Francisco-based Web site where people can buy and sell paper in industrial quantities over the Internet.

"WebCatalog is by far the fastest

Web sites, *page 74*



Source: O'Reilly & Associates, Sebastopol, Calif.

Hitachi brings personal touch to Web browsers

By Mitch Wagner

Hitachi Software plans today to announce a software tool that allows users to create personal indexes of the World Wide Web.

ZooWorks is a Windows 95 application that runs alongside almost any Web browser, tracks which pages a user visits and creates a database of the text of those pages on the fly.

Later, the user can call up ZooWorks from within a browser to look up sites by keyword and subject.

Users cheer

The tool should come in handy.

"I lose stuff all the time on the Web," said Ira Machefsky, an analyst at Giga Information Services, Inc. in Santa Clara, Calif. "It takes a while for me to find material that I found some months ago and lost and now have to find again."

Machefsky said the software serves as a complement to public-access search engines such as Yahoo and Alta Vista from Digital Equipment Corp. ZooWorks lets researchers and frequent Internet users answer the question, "What was the location of that site I saw a while ago about...?"

The software lets users delete references to Web pages that they find useless, annotate entries for Web pages or organize references to pages in folders according to subject or by any other hierarchy.

User Jim Gurfein, co-founder of the Diners' Grapevine, an on-line restaurant directory in Port Chester, N.Y., said a user-driven indexing tool such as ZooWorks could be pretty handy. "I think it's wonderful, given the availability of a plethora of information," Gurfein said.

However, what users really need are screening tools to separate the useful sites from the fluff, he said.

Find it fast

ZooWorks uses the Topic search engine from Verity, Inc. to index the uniform resource locator and full text of every document visited. A free beta version of ZooWorks will be available March 25 at http://zoosoft. com. The software will be generally available within eight weeks after that, priced at $39.95.

By the end of June, the company plans a server version that will index the Web and corporate intranets for workgroups.

Hitachi Software is a business unit of Hitachi Computer Products America, Inc. in Santa Clara, Calif.

New product

It knows where you've been

ZooWorks keeps track of all Web pages you've visited and keeps a running index of the text on all those pages.

- **Platforms supported:** Windows 95 client accessible from any Web browser on the same machine.
- **Availability:** March 25, beta version; product version is due out eight weeks later; LAN server version will be available in June.
- **Price:** Beta version is free; product version is $49.95.

Web sites

CONTINUED FROM PAGE 73

thing out there in terms of speeding data to the Web," Steele said.

The WebCatalog software was designed for any database application. It stores data in a flat file and generates pages automatically when visitors to a site request information, said Grant Hulbert, vice president of engineering at Pacific Coast Software in San Diego. Stored objects can include text, images and pointers to multimedia objects stored separately.

WebCatalog costs $695 for Apple Computer, Inc. systems.

Pacific Coast (http://www.pacific-coast.com) has also announced SiteEdit, an editor for Web sites that works within any forms-capable Web browser; and SiteCheck, which allows users to test out connections between two Web sites.

SiteEdit lets users edit Web sites using a forms interface on any Web browser; it doesn't require special software for uploading. Users access a special uniform resource locator (URL) connected to their site, which gets them a list of all the documents on a site. They pick one, then replace it with new text and coding, which is input using browser forms. The URL can be password-protected.

SiteEdit is available now for the Macintosh and will be available for Windows NT by the end of the month. It is priced at $39.95.

SiteCheck is a kind of automated proofreader for links from one Web site to another. SiteCheck automatically checks such links to be sure they actually connect to live Web sites on the other end. "Usually, companies hire a college kid to sit and click on links all day to make sure they're accurate," Hulbert said. "This is something that site operators can do."

SiteCheck is priced at $79.95 and will be available at the end of March for the Macintosh.

Search tools help lost users

CONTINUED FROM PAGE 73

Bethesda, Md.

Fulcrum Technologies, Inc. plans to announce this week a set of search products compatible with popular Web servers and targeted at intranet builders. Digital Equipment Corp., meanwhile, plans to make its Alta Vista engine available to information systems groups that create intranets.

But users must examine what they get for their search dollars. The search tools in Netscape's Enterprise Server, for example, index information on only a single Web server; Catalog Server can manage data stored on several servers.

The ability to comb information for concepts, rather than just keywords, is also important, said Zac Tolley, an information center analyst at a large U.K. company. That way, users don't have to know the precise name of a document or topic they are seeking, he said.

But even thorough search engines can't help users find everything they need, Tolley noted. The structure of an interface or application is what counts. "At the end of the day, a search engine cannot replace a well-planned Web server interface," he said.

Where to look

The Intranet Journal is an active on-line discussion group that tackles hot button issues for Internet-curious IS managers. Check out **http://www.brill.com/intranet.**

The search is on

Features to look for in intranet search facilities include the following:

- Customizable software agents that can search both intranet systems and the public Internet.
- Electronic-mail notification that sends users messages when a new piece of data appears that meets predefined criteria.
- Natural language capabilities that let users enter English words and phrases rather than structured word strings.

But today's search engines don't do some life-simplifying functions, said Tamas Doszkocs, a computer scientist at the National Library of Medicine.

For example, many search engines don't return results in chronological order. "But that would be a very simple thing because Hypertext Markup Language can be time-stamped," he explained.

— Kim S. Nash

Briefs

HP buys in to Web

Hewlett-Packard Co. recently bought in to **Business@Web**, an Internet business applications development firm headed by former SAP America, Inc. President Klaus Besier. Financial terms weren't disclosed. The firms will use Business@Web's object-oriented OpenScape tools to jointly design and build Internet links to customers' strategic business applications. Business@Web is a spin-off of Cambridge Technology Group.

Internet access

Encore Computer Corp. in Fort Lauderdale, Fla., has introduced a software/network adapter combination that provides Internet access to data stored in its Infinity SP disk arrays that support mainframes and Unix servers. Internet Data Facilities includes a blocking feature that lets customers keep portions of their data inaccessible to World Wide Web browsers. Annual licensing fees start at $25,000.

File Edit View Go Bookmarks Options Directory Window 8:00 AM

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COMPUTERWORLD

Everything you need to know

New Products

InText Systems, Inc. has announced InText WebPack, a tool for World Wide Web site development.

According to the San Francisco company, InText WebPack lets users build dynamic, searchable Web sites through a point-and-click interface. It also lets users automatically convert Windows documents in more than 80 file formats into Hypertext Markup Language and generates hyperlinks between documents. It stores documents in folders and builds an index to make the documents searchable.

InText WebPack includes a retrieval engine that helps users find specific information on their Web site or company intranet. It also includes document summarizing and natural language querying features.

Pricing for InText WebPack starts at $12,500. An evaluation copy is available at http://www.intext.com.

▶ *InText Systems*
(415) 391-5290

NetCarta Corp. has introduced CyberPilot Pro, a navigation tool for the World Wide Web.

According to the Scotts Valley, Calif., firm, CyberPilot Pro operates alongside most popular Web browsers. The product lets users create maps of any site to help pinpoint exact information. The maps are condensed visual representations of the structure and content of Web "spaces."

These spaces can be an individual site, a collection of sites or a collection of individual Web pages unified by a common theme.

CyberPilot Pro was designed to give users Web management, advanced navigation, site analysis and structure-based search and retrieval functions.

CyberPilot Pro costs $100.

▶ *NetCarta*
(408) 461-8920

Quarterdeck Corp. has introduced WebCompass Personal Edition, a metasearch engine that prepares an index of search results and an abstract of all query data through a point-and-click interface.

According to the Marina del Rey, Calif., company, it works with all major World Wide Web browsers.

It also requires an Intel Corp. I486 or higher processor, 8M bytes of RAM and 3M bytes of disk space. It runs on Microsoft Corp.'s Windows 3.x, Windows 95 or Windows NT.

WebCompass Personal Edition costs $39. A free trial version is available at http://www.quarterdeck.com.

▶ *Quarterdeck*
(310) 309-3700

Fujitsu Microelectronics, Inc. has introduced its ISDN Internet Surfer PC Card, an Integrated Services Digital Network terminal adapter.

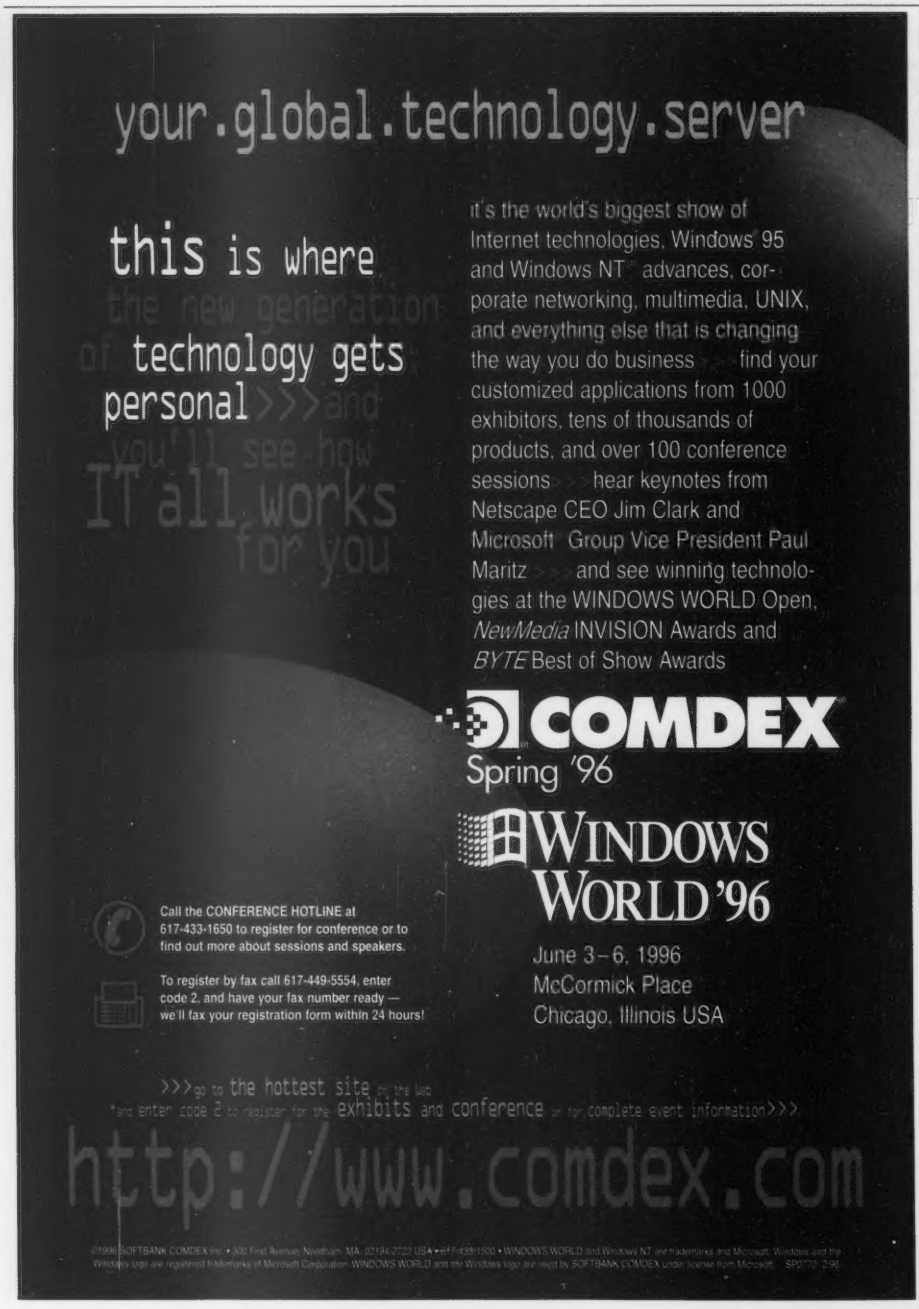
According to the San Jose, Calif., company, the card gives mobile users high-speed access to the Internet. It is Windows 95-compatible and was designed to offer data transmission rates two to three times faster than those delivered by a conventional 28.8K bit/sec. modem.

ISDN Internet Surfer includes a service map that illustrates the regions of ISDN availability across the U.S. It costs $369.

▶ *Fujitsu Microelectronics*
(408) 922-9000

Product short

Sausage Software Ltd. in Doncaster, Australia, has announced Egor, a commercial applet for Sun Microsystems, Inc.'s Java. Egor lets users design animation sequences in the graphics interchange format for World Wide Web pages. It can animate clip art and images. Cost: $50. Egor can be purchased only through Sausage Software's Web site at http://www.sausage.com.



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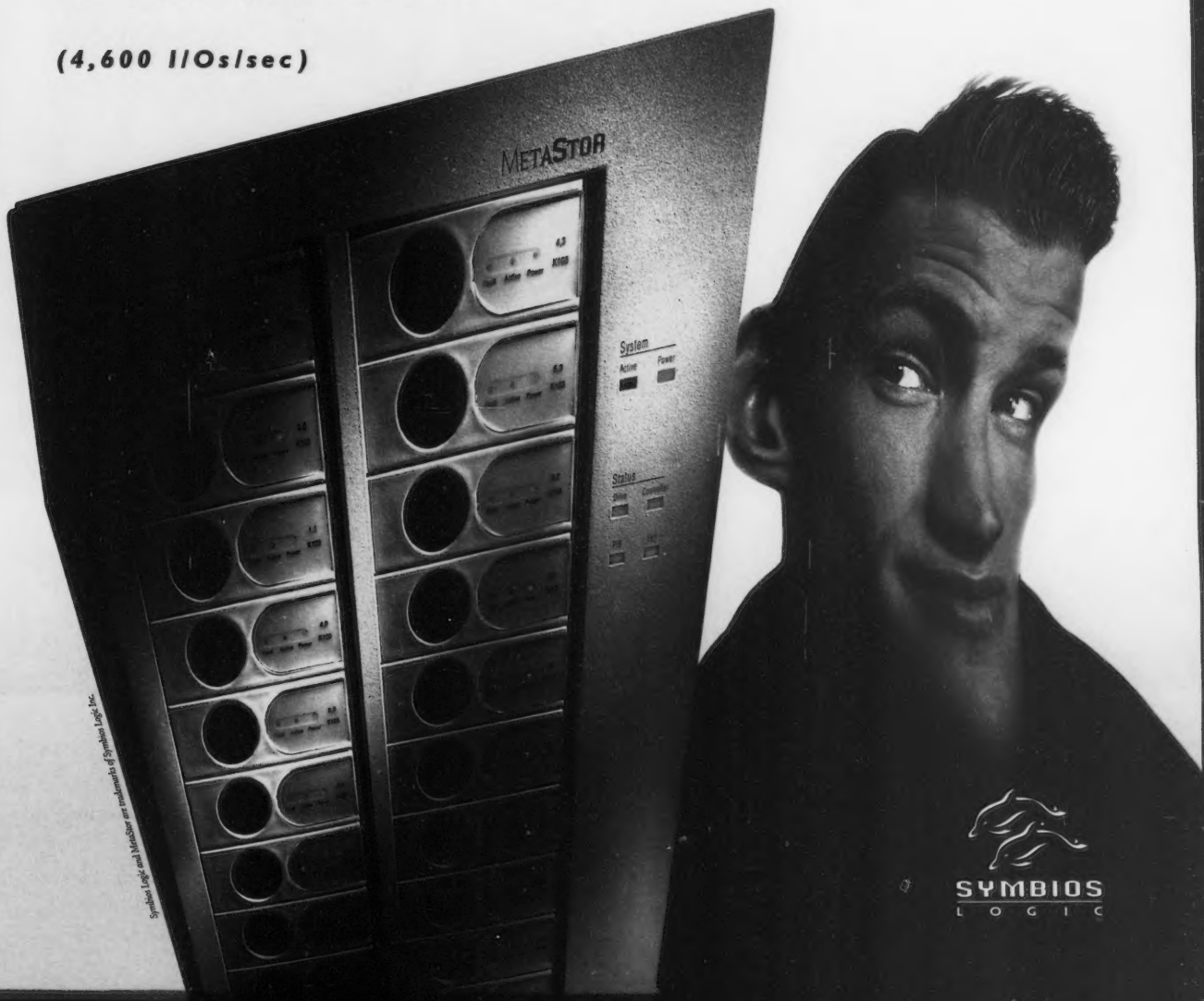

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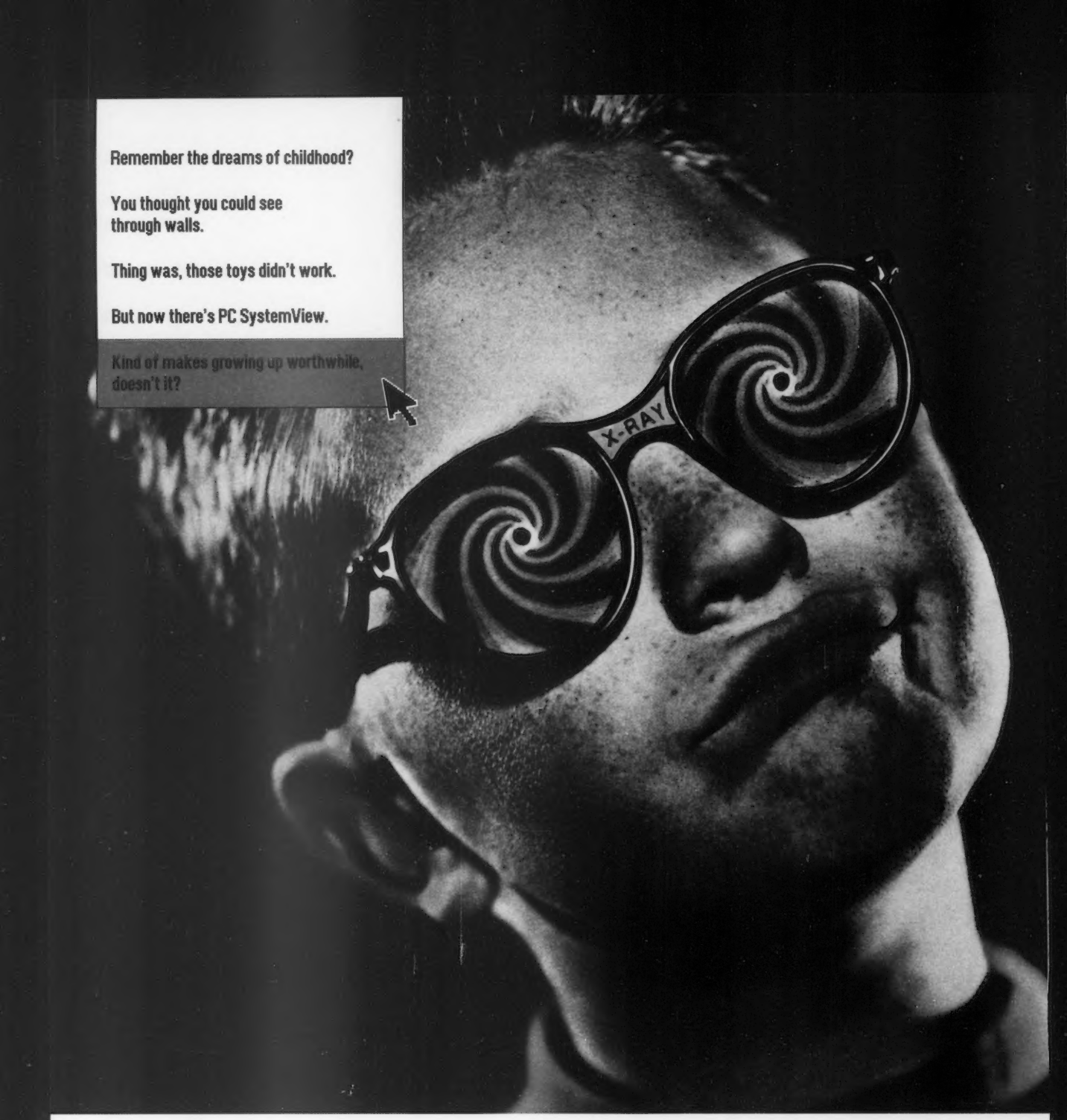

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6155

Security principles are being developed to guide IS professionals, 80

Corporate Strategies

Nasdaq tool pays dividend

WinRunner speeds quality assurance testing

By Thomas Hoffman
TRUMBULL, CONN.

Until recently, checking the quality of the software applications it rolls out to its subscribers was a time-consuming exercise for The Nasdaq Stock Market, Inc.

Now, thanks to an automated testing tool, the all-electronic stock market is seeing 8-to-1 productivity gains.

In the past, Nasdaq's quality assurance analysts spent hours testing individual workstation and host applications.

Nasdaq's "acid test" and bitmap verification tests would ensure that data in each application program field was accurate and wouldn't, for example, change other programs.

To streamline its testing procedures, Nasdaq began looking for an automated tool. There were plenty on the market, but Nasdaq was able to find only one that handled Neuron Data, Inc. graphical user interfaces (GUI). Nasdaq uses a Neuron GUI as a front end to its Nasdaq Workstation II applications.

The tool that supported Neuron Data was WinRunner from Mercury Interactive Corp. in Sunnyvale, Calif., according to Robert J. Hughes, director of quality assurance production services at Nasdaq.

To ensure WinRunner's effectiveness, Nasdaq paid $75,000 to test the software over a 90-day period beginning in November 1994.

Time-saver

Its first functional test with the tool came in early 1995 with its Automated Confirmation Test (ACT) system, a Tandem Computers, Inc.-based trade reconciliation system. With WinRunner, Nasdaq tested 2,100 lines of ACT code in 80 minutes. Manual testing typically would have taken five hours.

"With this tool, we're getting better-quality products by being able to regression-test more effectively," said Anthony W. Szerszen, manager of configuration management and test tool development in the quality assurance group at Nasdaq.

Regression testing makes sure that a new application has no effect on other applications in the same operating environment.

Since purchasing the software for another $60,000 last spring, Nasdaq has used it to test its Small-Order Execution System (SOES) and SelectNet.

SOES is an automatic order system used for orders of up to 1,000 shares. SelectNet is an online screen negotiation and execution service that lets companies send orders of any size for any amount to market makers over a Nasdaq PC.

Nasdaq's end users appreciate WinRunner's speed.

"It's much easier to use [WinRunner] than to do manual regression testing," said Carson Shaw, a quality assurance analyst. He has used WinRunner for the past six months to test Nasdaq's ACT and other systems.

Shaw and other Nasdaq technicians need to remain focused on moving the world's second-largest stock exchange forward — especially given Nasdaq's recent problems.

Government probe

Nasdaq is being investigated by the Securities and Exchange Commission and the U.S. Department of Justice for the wide spreads between the "bid" and "ask" prices for Nasdaq stocks. The current spreads tend to favor brokerages at the expense of small investors, for whom Nasdaq was originally created.

"Rolling out new applications is important to [Nasdaq], but the heat is on their policies right now," said Larry Tabb, a technology analyst at The Tower Group, a financial services consultancy in Wellesley, Mass.

This summer, WinRunner will be used to test a Tandem-based application that shows the most recent sale price for a stock and other historical information, Szerszen said.

JERRY VALENTE

Nasdaq's quality assurance analysts *Robert J. Hughes, left, and Anthony W. Szerszen have seen productivity gains in the company's application testing procedures since Nasdaq began using Mercury Interactive's WinRunner*

Northpoint Properties' Tom LeCain *says the wireless MLS gives brokers more mobility. Freed from the need to return to the office to check a listing, brokers are more productive.*

Wireless MLS is moving in

By Mindy Blodgett

Let's say you have been promoted to an important new position.

The bad news is that in just a few weeks you have to move to a city halfway across the country. You call your local real estate agent, who whips out a laptop and makes a wireless connection to a national database.

Within an hour, you and the agent have whittled down a large list of properties to a handful of interesting prospects, and the agent sets up appointments for you to view them during a weekend visit to your new town.

This scenario may be fantasy at the moment, but a budding wireless Multiple Listing Service (MLS) spearheaded by IBM's Wireless Group eventually could lead to just such an efficient means of house-hunting. In a few cities, users who have portable devices can already look up property information in participating MLS listings.

The wireless MLS is being tested in sections of New Jersey over the RAM Mobile Data USA L.P. network. It is being tested in Phoenix using the CellularOne network via Cellular Digital Packet Data. A wireless MLS program via the ARDIS Co. network in Atlanta is about to go commercial.

Tom LeCain, executive vice president of Northpoint Properties in Roswell, Ga., has outfitted 12 agents with wireless laptops. He said wireless MLS is ideal for the hot Atlanta real estate market, which is noted for its rapid turnover.

"The wireless MLS allows us to be as productive as possible and to get information as quickly as possible," LeCain said. "In this business, we work astronomical hours — 70, 80 hours a week. Not only does this wireless system make us

Wireless MLS, *page 80*

Security plan hopes to give IS protective custody

By Gary H. Anthes
ORLANDO, FLA.

Perhaps the most common shortcoming in a company's security plan is that it has no plan.

That will be a lot easier to fix when the Generally Accepted System Security Principles (GSSP) roll off the presses or are posted at a World Wide Web site near you.

The GSSP are intended to guide vendors and users and will join the ranks of similar guidelines for the medical, legal and accounting professions. Some of the guidelines are available already; more detailed suggestions will be available later this year.

Safe and sound

"GSSP would establish a set of requirements for good practice that would be well-understood by systems developers and security professionals, accepted by government and recognized by managers and the public as protecting against security breaches."

Source: "Computers at Risk," 1990, National Research Council, Washington.

At least one customer has put the GSSP to good use. Consumers Gas Co. in North York, Ontario, used an early draft of the GSSP to help migrate its mainframe-based security plan to a client/server environment. "I used their principles as a template," said Wes McClean, manager of security planning. McClean said the guidelines were very useful and gave the company "an organizational structure in which to place things."

A recent survey of more than 7,000 organizations turned up widespread support for the GSSP among information security professionals. But it also showed mixed awareness of, and support for, the GSSP among top managers (see chart).

Development of the GSSP was a high-priority recommendation in "Computers at Risk," an influential report about computer security published by the National Research Council in December 1990.

"The basis of a profession is to profess, to declare in front of others that you will abide by certain principles," said Kristen Noakes-Fry, president of Noakes-Fry Associates in Seminole, Fla., and a member of the committee that drafted the GSSP.

The private sector is driving the development of the GSSP; that includes top managers who are increasingly concerned about information security. "The boardroom asks, 'Is there one document we can turn to to see if we are in compliance?' The answer is, 'No, there is not,'" said Will Ozier, president of OPA, Inc. in Petaluma, Calif.

Moving ahead

Ozier is chairman of a 30-person committee formed by the Information Systems Security Association in 1992 to develop the GSSP. He recently outlined progress on the GSSP at the MIS Training Institute conference here on open systems security.

The security principles will occupy three tiers in a hierarchy.

At the top are nine "pervasive principles" such as "Information security accountability and responsibility should be explicit." These are included in Draft 2.0.

At the second level will be 50 to 75 more detailed principles such as "Computer systems must have logical and physical access controls." A draft of these principles is set to be released in July.

At the lowest level will be many detailed, frequently changing principles such as "Passwords must be at least eight digits long." The GSSP committee hopes to begin drafting these guidelines by the end of this year and complete them a year later, Ozier said.

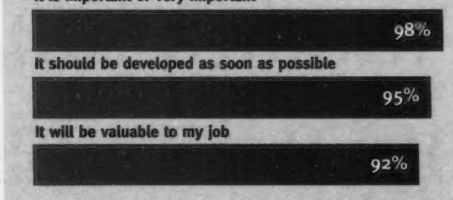
The security principles will carry some risk, experts warned. "When they become the standards for due care, there will be a legal implication," said Hal Tipton, principal at HFT Associates, Inc. in Villa Park, Calif.

"Vendors can be liable for not building the principles in to their products, and users can be held liable for not following them," said Tipton, one of the authors of the National Research Council report.

The buzz on GSSP

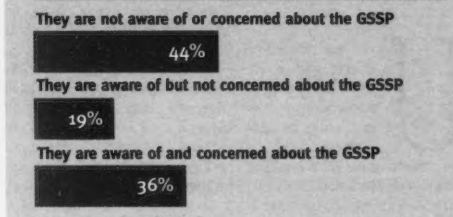
While many security professionals feel strongly about the GSSP . . .

What are your opinions on the GSSP?



. . . senior management does not feel as strongly.

What is the opinion of your senior management when it comes to the GSSP?



Base: 700 security professionals

Source: OPA, Inc., Petaluma, Calif.

Wireless MLS

CONTINUED FROM PAGE 79

more productive, it gives us more of a life. Not having to spend so much time at the office gives us more free time."

Real estate agents can connect from anywhere to get new listings and other kinds of information; they don't need to return to the office or search for a telephone line for dial-up access, LeCain said. This raises productivity, he said.

The wireless MLS, which is sold through Inacom Corp., a reseller based in Omaha, comprises IBM notebooks and wireless modems and software from Software Corporation of America in Stamford, Conn. IBM notebooks come bundled in the deal, but other notebooks can work with the service, according to IBM officials.

Pricing is still being set. Agents can lease a modem, computer and software from IBM's Wireless Group for $190 per month. The agents also pay a monthly charge of $20 for access to regional MLS listings.

Despite his enthusiasm for MLS, LeCain, who hasn't been charged for network use during testing, said he is concerned about airtime costs linked with wireless transmissions.

"But ARDIS said they may be charging us a flat fee of $65 for unlimited use each month, which would be great," LeCain said.

"The everyday [agent] might have trouble configuring the equipment, as well. I'm computer-savvy, so I set up the systems for my office, but I think concern about technical aspects of this is slowing implementation for others," he said.

Michael Boyd, manager of business development at IBM's Wireless Group, said the system is better for busy real estate markets. But he said that interest from agents across the country is high, and he expects there soon will be wireless MLS programs up and running across the country.

Briefs

The future is clear

Information Discovery, Inc. in Hermosa Beach, Calif., has announced IDIS Predictive Modeler, a tool that analyzes large relational databases. It costs $1,900 for the Windows version and $25,000 for the version for Unix servers. IDIS Predictive Modeler requires IDIS, another Information Discovery product, which costs the same as the modeling tool.

CSC wins deal with Johns Hopkins

Johns Hopkins Health Systems, the parent company of Johns Hopkins Health Care in Baltimore, a mid-Atlantic managed health care provider, has signed a five-year outsourcing deal with **Computer Sciences Corp.** (CSC). Under the pact, CSC will provide technology and services to help manage John Hopkins' eligibility verification and claims processing systems.

Floral service plants desktop services pact

Unisys Corp. has won a three-year, $10.6 million desktop services contract from **Redbook Florist Services** to deliver, install and support Unisys PW2 advantage PCs to 15,000 florists nationwide.

Bank launches home PC services

Financial Trust Corp. in Carlisle, Pa., a bank with $1.1 billion in assets, will let customers pay their bills by telephone and will offer PC-based home-banking services to customers via electronic services offered by **Fiserv, Inc.** and **Checkfree Corp.** Financial Trust has outsourced its data-processing operations to Fiserv for 24 years.

Denny's orders out

Flagstar Cos., a Spartanburg, S.C., firm that owns more than 2,500 restaurants, has signed a 10-year outsourcing deal with **IBM** worth $323 million. IBM's Integrated Systems Solutions Corp. subsidiary will manage Flagstar's systems, networks, application development and help desk operations. Flagstar expects to save more than $150 million over the life of the deal. It is the largest franchisee of Hardee's restaurants and owns and operates Denny's, El Pollo Loco and Quincy's Family Steakhouse.

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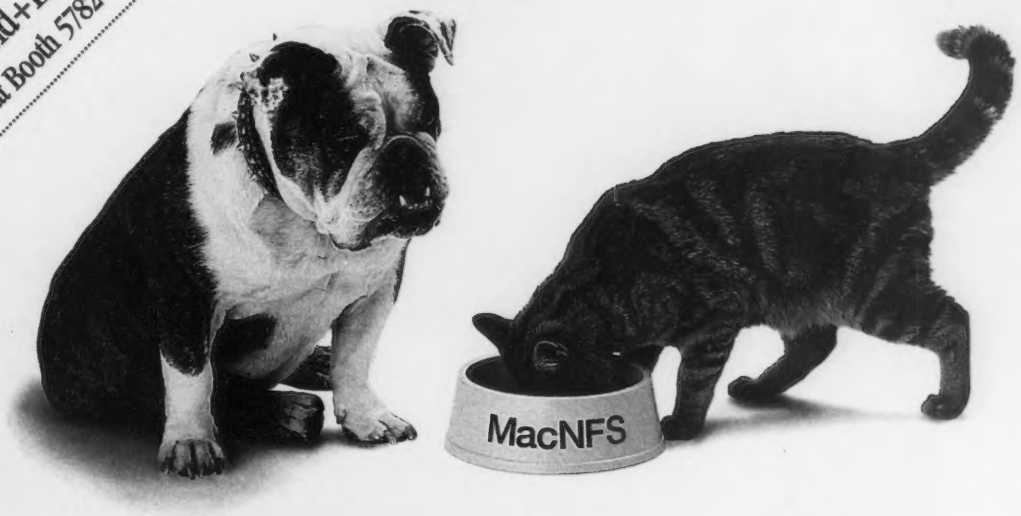

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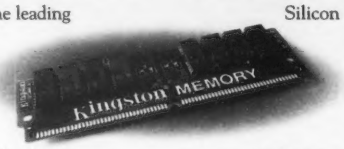

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Managing

HAVE A HAPPY MILLENNIUM!
TURN TO PAGE 86 FOR A LISTING OF YEAR 2000 CONFERENCES, WEB SITES AND GROUPS.

Everybody knows about the year 2000 problem, but The Equitable decided to

BRIAN SMALE

Face up to it

Bill Born has great credentials for fixing The Equitable Life Assurance Society's year 2000 problem — he helped create the mess 20 years ago.

As a young programmer, Born was assigned to find out why the insurer's Computer Assisted Policyholder Service (CAPS) system continued to report policies dating back to the late 1800s as new business.

Born discovered that the problem was that CAPS, similar to most other systems of the day, used only two-digit year codes, so the system couldn't differentiate between centuries.

Face up to it, *page 84*

BY ROBERT L. SCHEIER

Face up to it

CONTINUED FROM PAGE 83

Because the oldest policy in the system is from 1893, Born had changed CAPS to regard policies with a date over "92" as old business. That would work until the early 1990s, when "nobody was expecting these systems to still be around," he remembers.

But CAPS is still around, accounts for $1 billion in annual premiums and hit the wall again in 1993. This time, Born says, "it hit me that I had put the problem in."

The wake-up call gave The Equitable a head start in fixing CAPS and other applications that will run into trouble by the year 2000. The firm was also lucky because it still employs information systems veterans who know CAPS and insurance inside out. Its ambitious approach to solving the problem seems to be working because the New York-based company finished a pilot of its year 2000 conversion in December, and team members are 80% confident that they will finish the work by year's end.

Choose your weapon

The CAPS team considered four ways to solve the year 2000 problem. They chose the first; another choice might be best for you.

THE APPROACH
Fix the system by converting existing code and data.
WHEN TO CONSIDER IT
System is mission-critical; prohibitive time or cost to rewrite. Have good in-house expertise.

THE APPROACH
Replace the system.
WHEN TO CONSIDER IT
System is a commodity application with little value-add for your company. You are sure the vendor (or your staff) can deliver the new system on time.

THE APPROACH
Run your homegrown code through an outside service firm's "black box."
WHEN TO CONSIDER IT
You have confidence in the vendor and understand you'll still have to do a major analysis of the existing application and test the converted code.

THE APPROACH
Leave it to the software company that developed the application.
WHEN TO CONSIDER IT
Vendor is large and viable enough to do the conversion. You'll still have to retrofit the new version on top of any customizing you've done to the existing version.

Advance planning

The plan for CAPS Millennium, as it came to be called, was unveiled on Nov. 1, 1994 after seven months of work by a team headed by division manager Jim Fox. The team proposed splitting the year 2000 fix into manageable subtasks and improving CAPS at the same time.

Fox and his team didn't want to rewrite CAPS on a client/server architecture, which Senior Vice President and Chief Information Officer Leon Billis estimates could cost upward of $250 million — with no guarantee it could even be done. The team was also skeptical of vendors' "black box" solutions of taking CAPS code and returning it year 2000-compatible. Even if the vendor delivered, The Equitable would still have to figure out which fields to convert and debug the interfaces among the 1,500 CAPS modules.

The team's solution reminds Born of the joke about how to eat an elephant: one bite at a time. Fox proposed correcting CAPS one module at a time, with Cobol "bridges" analyzing data streams between corrected and uncorrected modules and doing any needed translation. This means that work on individual modules can proceed without waiting for other modules to be fixed. Once the code is corrected, the team will convert the 2.1 million master records in the CAPS database using the same bridge programs.

Fox also needed to make the elephant appetizing. Early cost estimates for the fix ran upward of $8 million, a high price just to fix a problem. Fox stayed under the budget radar until he had a defensible plan. He took technical director Ron Johnson and senior systems analyst Joe Cherichella off other projects so planning work wouldn't require formal funding.

The resulting proposal not only included expanding the date fields to four digits, but also expanding other elements such as the face amount on policies, which determines how much the insured can be paid in case of a claim. The team also proposed recompiling the application so it no longer would rely on a Cobol compiler, which IBM will stop supporting this summer. Fox's proposal reads like a marketing piece with its own logo and the words "The Time is NOW!" Enhancements, not the date problem, were the centerpiece of the proposal.

Billis approved the first, or "risk avoidance," phase in late 1994 but ordered that its $2.6 million price be cut. He was already exploring the idea of using offshore programmers to lower information technology costs and drove a hard bargain with HexAware Technologies, Inc. in Princeton, N.J., and Bombay, India. HexAware is doing much of the work in Phase 1 for little or no profit, which Fox estimates will cut the Phase 1 cost to just under $2 million. In return, HexAware gets experience and an inside track on future work.

Fox's team did a pilot on the "automatic collections" portion of CAPS, which consists of about 75 modules that represent a cross-section of code and platforms found in CAPS. As part of the pilot, the team also revised four separate test environments to reflect the expanded year fields. Despite the immaturity of the automated tools and the incompatibilities between the old and new versions of Cobol, the pilot went into production on schedule, and Fox says he expects the CAPS code conversion to be done by year's end. The only real risk, Born says, would be losing key members of The Equitable or HexAware teams.

The year 2000 work "is just a big maintenance project," Johnson says, but that makes it sound easy. The Equitable was in a good position because it understood CAPS, owned the source code and had proven maintenance methodologies and test suites. When an information technology organization doesn't hold such cards, it must consider other options (see chart).

Some critics argue that The Equitable risked failure by overloading the year 2000 conversion with other work. Born admits the team "agonized" over that but points out that the other changes open up new business opportunities.

"We've got 2 million lines of code," Johnson says. "We've got to look at them all and recompile them all" just to change compilers and the date elements. "Once we've gone through this, we don't want to look at all that again." Eating an elephant once is enough, no matter how many pieces it's in. ■

Ron Johnson, Ralph Thomas and Jim Fox are manning the front lines as The Equitable grapples with the year 2000 conversion.

BRIAN SMALE

Scheier is a *Computerworld* senior editor, Management.

F.Y.I.

Database dynamos

Here's an obscure marketing award you should know about: the Information Technology and Analysis Awards, recently handed out by the New York-based Database Marketing Association.

The reasons you should know about this award are: 1) Great ideas, 2) Advanced technology, 3) Information systems had little to do with them.

Consider A. B. Data in Milwaukee, a direct marketer that specializes in fund-raising. Its winning neural network application in a telemarketing campaign increased profit per donor from $1.22 to $1.62 in eight months.

Research director Gary Plouff says the system predicts which donors are "highly likely to be very profitable" in the next year. That lets fund-raisers focus on them, a switch from targeting Daddy Warbucks donors who may require expensive coaxing.

Plouff built the system, which contains 12 individual neural network models running off a database, using neural network software on a 66-MHz 486-based PC. The software is from Advanced Software Applications in Pittsburgh. IS just loaded the client's data onto A. B. Data's Novell, Inc. network, Plouff says.

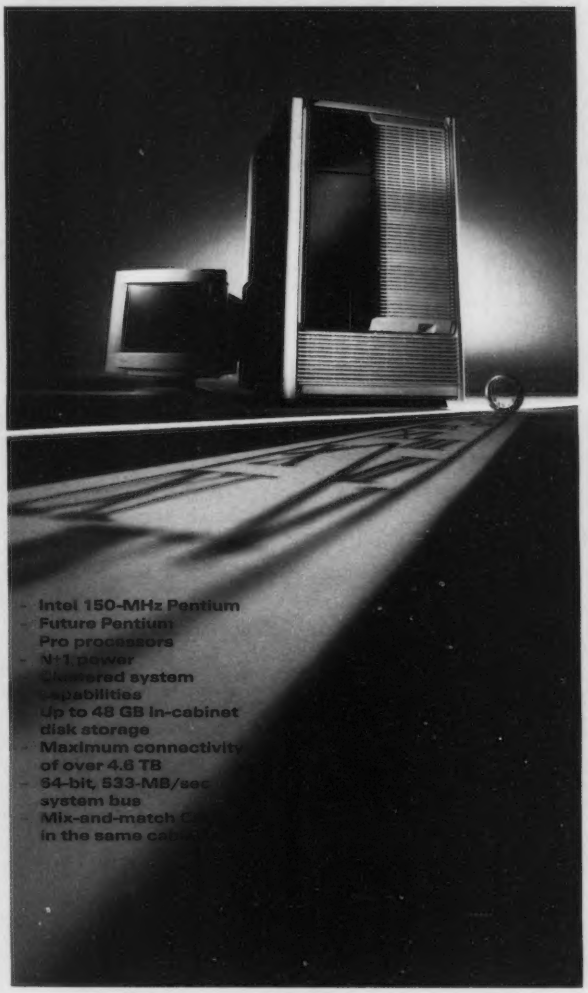
That endeavor is hard to beat unless you are Judith Behrens, database marketing manager at the direct response division of Allstate Life Insurance Co. in Northbrook, Ill. The division's average premium paid per customer has increased 287% since April 1985.

How? Behrens' team created a database that consolidated information on each customer: the Allstate policies they hold, the contacts they've had with the insurer, their responses to past promotions and demographic data.

Now marketers can finesse which policies to pitch and how they pitch them based on how customers respond. "Instead of a couple of mass mailings a year, we are making more contacts with people and more customized contacts. They are the kinds of contacts people want," Behrens says.

The IS role? Not much. Metromail Corp., a service bureau in Lombard, Ill., created and maintains the database. The team member from IS did little more than help select the outsourcing vendor. — *Allan E. Alter*

The only thing as good as a brand-new server is a server that stays brand new.



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HAPPY MILLENNIUM!

Don't let Jan. 1, 2000 be a day of wailing and gnashing of teeth. Start solving the year 2000 problem now with the help of these user groups, on-line sites, publications and events.

BY ROBERT DIETERICH

ISSUE/USER GROUPS

Millennium User Group
Contact: Steve Hamilton
Computer Horizons
Cincinnati
(513) 769-3355

Though established with help from Computer Horizons, a year 2000 service provider, this user group was designed to be independent and nationwide in scope. Membership isn't limited to the company's clients, and representatives of more than 50 large companies have joined so far.

Arizona Millennium Group
Contact: Stan Price
City of Phoenix Information Technology Department
Phoenix
(602) 261-8391
E-mail: sprice@ci.phoenix.az.us

At vendor seminars and other year 2000 events, Price kept running into the same people and managers from other IS departments in his region. He reasoned that regular contact among this group might prove more helpful than anything else. The group has close to 30 members. There are no fees for joining.

Midwest 2000 Share Group
Contact: Len Schulte
St. Louis
(314) 827-2264
E-mail: schultelf@maritz.com

Brainstorming is the key activity at this regional group's bimonthly meetings, Schulte says, although one vendor usually is invited to give a short presentation. Companies are asked to pay a $150 fee to help administer the group. Meeting sites rotate.

The newsletter "Tick Tick Tick" (see above) provides a list of people who are forming — or want to form — new year 2000 issue/user groups.

ON-LINE RESOURCES

Year 2000 Information Center
http://www.year2000.com.

This site is maintained by Peter De Jager, self-described "awareness guy" for the year 2000 issue [CW, Nov. 20, 1995]. It provides information on tool vendors and service providers, lists articles and events and answers frequently asked questions.

Year 2000 Mail List
Send electronic mail to listmanager@hookup.net with "subscribe year2000" in the body of the message.

Also from Peter De Jager, this discussion list targets managers who deal with year 2000 issues. It gets hundreds of postings every week and a lot of practical advice.

REPORTS

"The Year 2000 and 2-Digit Dates: A Guide for Planning and Implementation" can be downloaded from an IBM Web page: **http://www.s390.ibm.com:80/stories/tran2000.html.**

This 180-page "customer guidance paper" was published by IBM last October. It is particularly useful for finding out what IBM software is or isn't year-2000-ready, but it also provides a solid introduction to the issue and a good bibliography.

TRADE ASSOCIATIONS

Information Technology Association of America (ITAA)
Contact: Deborah Head
ITAA
Arlington, Va.
(703) 284-5306
http://www.itaa.org

A trade association for software vendors and service providers, ITAA has published a short white paper and a buyer's guide for year 2000 tools and services; a directory of year 2000 vendors is in the works. The publications are free. It has run several year 2000 seminars at government agencies and plans another in Washington in April.

PUBLICATIONS

"Tick Tick Tick, The Newsletter for Millennial Management"
2000AD, Inc.
New York
(800) 643-8425

Subscriptions are $75 per year for this quarterly publication. Bill Goodwin, editor of this independent newsletter, provides discussions of conversion tools and service providers, tales of the experiences of year 2000 project managers, event listings, vendor advertisements and gossip. He is helping regional issue/user groups form.

CONFERENCES AND MEETINGS

Year 2000 Conference and Exposition
April 3-4, Chicago
Sept. 11-13, San Francisco
Contact: Linda O'Donnell
Software Productivity Group
Westboro, Mass.
(508) 366-3344, ext. 244
http://www.spgnet.com.

Insurance, Banking & Financial Services: IT Systems Conversion for the Year 2000
June 17-18, Boston
Contact: Sarah Bock
IBC USA Conferences
Southboro, Mass.
(508) 481-5400, ext. 252

Year 2000: Issues and Answers
June 19-20, Boston
July 31-Aug. 1, Austin, Texas
Oct. 3-4, Orlando, Fla.
Contact: Digital Consulting, Inc.
Andover, Mass.
(508) 470-3880
http://www.dciexpo.com
E-mail: confreg@dciexpo.com

Mutual Survival

MassMutual's Ron Cote doesn't want to wear sackcloth when the millennium dawns

At Massachusetts Mutual Life Insurance Co., the year 2000 conversion effort is part of an effort called the Survival Project. "If we don't do this, it's shut the lights off and go home," says Ron Cote, a year 2000 project leader.

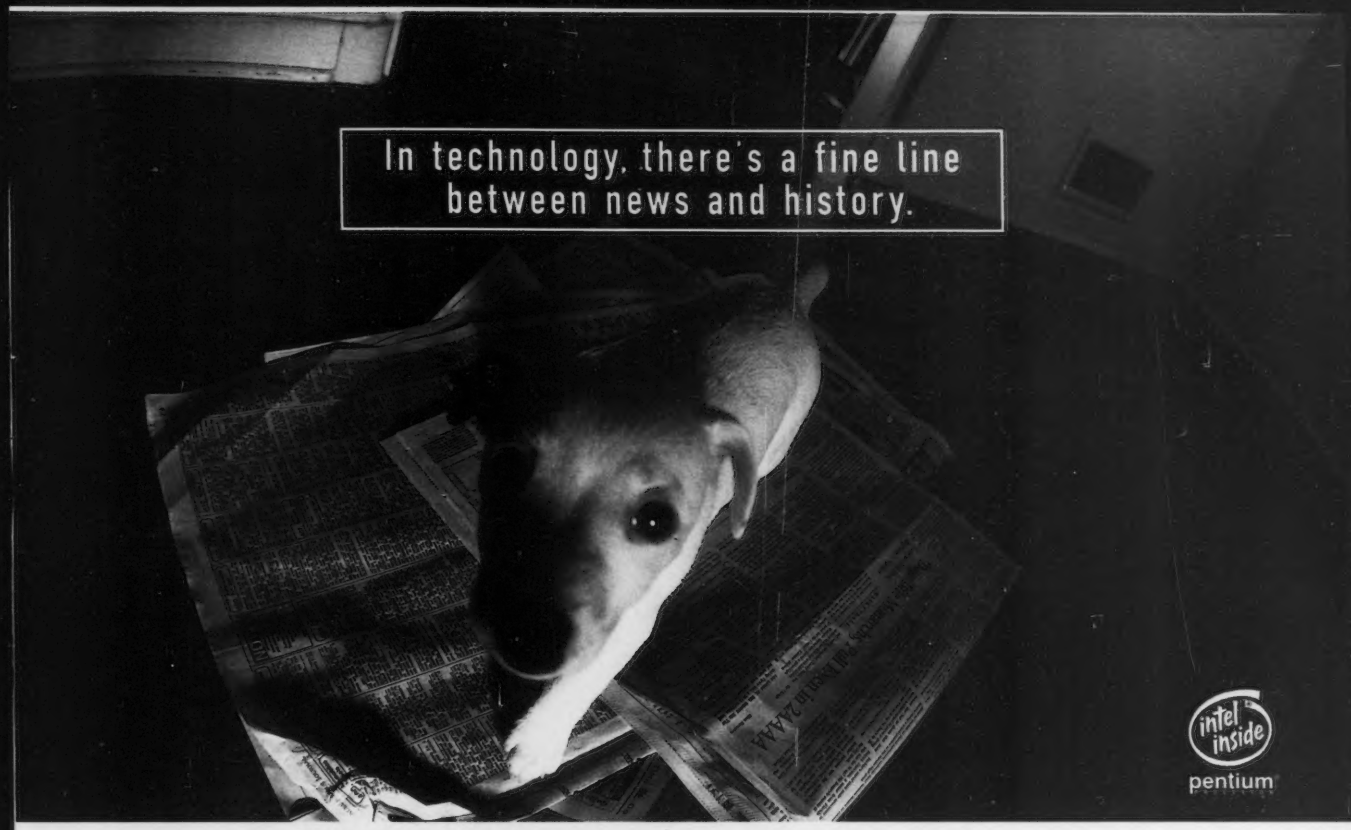
Cote says MassMutual in Springfield, Mass., has been aware of the year 2000 issue for more than 10 years. The information systems department developed some work-arounds but found them unsatisfactory. It became clear, Cote says, that "we needed a more concentrated effort in this area. We had to pick up and identify year 2000 as a survival issue."

MassMutual has hired three service providers to do the actual work. The job entails reviewing 45 million lines of code companywide and making changes as needed. Then there's the testing of the converted software and its implementation. MassMutual's schedule calls for completion of the Survival Project by the end of 1998, providing a one-year cushion.

Cote's advice to other IS professionals? "Start now. Don't wait. Take our word for it. There is a problem, and you need to get involved."

Cote says that attending a conference can be a nice place to start, "and the year 2000 Web site has a lot of good stuff." If you work in an IBM shop, he adds, the IBM year 2000 white paper is "very useful."

Dieterich is a freelance writer in New York.



This is news.

Let's face it. Everybody's worried that by the time they get a new computer, it's already old. That's why we're bringing you the latest technology sooner, so you can use it longer. Namely, Intel's hot-off-the-press 133 MHz Pentium® processor, now in two powerful AST® notebooks. The Ascentia™ P Series is packed with slick features like our SmartBay™, which houses a removable high-speed CD-ROM drive that you can swap with an extra battery or floppy drive. The Ascentia J Series is just as newsworthy, yet more affordable. Among other things, it boasts built-in 16-bit audio, integrated modem, and a Lithium Ion battery. And of course, they both offer the latest processor. So call 800-876-4AST for a reseller near you. Or check the net at: http://www.ast.com. After all, you deserve a notebook with a future.

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Ascentia J *133 MHz Pentium processor, 8 MB RAM standard, 800 MB hard drive, 10.4" (diagonal) Super VGA TFT screen, 16-bit audio, Lithium Ion battery, integrated modem.*

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- **Enterprise Application Development**
- **Distributed Systems Management**

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Doing Business on the Internet

Panel Moderator:
Gay Slesinger
Vice President
Giga Information Group

Panelists: Jim Banister, Warner Bros. Online • Brian Boyd, United Video Satellite Group • Steve Dieringer, Banc One • Steven Sayre, Lotus Development Corporation

Discover what this phenomena means to business and the distributed enterprise.

Find out if the Internet is "an aging technology looking for problems," or the prototype of a new world of networks that will change the face of business.

Enterprise Networking

Panel Moderator:
Tim Andrews
Vice President
CSC

Panelists: Tom Brake, Pacific Gas and Electric • Marc Dodge, UPS • Alan Guibord, R.R. Donnelley & Sons • Tom Thomas, 3COM Corporation

Examine how the latest in converging communications technologies has been implemented to meet challenges faced by top corporations worldwide.

Hear candid discussion on building infrastructure, deploying high-speed communications, internetworking and implementing new broadband applications, which combine voice, data and images.

Enterprise Application Development

Panel Moderator:
Alan Alper
Editor
Computerworld Client/Server Journal

Panelists: Richard L. Hudson, Global Marine, Inc. • Mitchell Kertzman, Powersoft Corporation and Sybase • Gary R. Osborn, Hughes Space and Communications Company • Roger Thibodeau, Connecticut Mutual Life Insurance Company

Explore the latest advances in application development, including the "killer-app of the '90s," data warehousing.

Listen to panelists reveal which new advances in application development work...and which don't.

Distributed Systems Management

Panel Moderator:
Maryfran Johnson
Executive Editor
Computerworld

Panelists: Brian Buck, Platinum Technology Incorporated • Chet Geschickter, Judith Hurwitz Consulting Group • Andy Mullins, Candle Corporation • Frank Petersmark, Amerisure Technical Services • Tim Tokarsky, Merrill Lynch

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Executive Track

Crown Books Corp. announced that **Keith Hammer** has been appointed vice president and chief information officer. Hammer joined the Landover, Md., bookstore chain in 1994 as assistant vice president and director of information systems. Hammer previously served as a director of MIS at Circuit City Stores, Inc.

Max D. Hopper, the retired IS chief at AMR Corp., has been named a director at large by the **Microelectronics and Computer Technology Consortium** in Austin, Texas.

Sears, Roebuck and Co. in Hoffman Estates, Ill., has promoted **Jerry Miller** to the new post of vice president, logistics systems. He reports to Joseph Smialowski, Sears' CIO. Miller was senior director, logistics systems at the retailer.

Cablevision Systems Corp. recently promoted **Thomas C. Dolan** to senior vice president and CIO. Previously, Dolan was vice president and CIO at the Woodbury, N.Y., cable television systems provider.

Louis Roberts and **Michael Livolsi** are now vice presidents of information technology at **First Montauk Securities Corp.**, a subsidiary of Montauk Financial Corp. Roberts, who previously worked at Bellcore, will be responsible for First Montauk's systems and software and will evaluate new technology. Livolsi will run the Red Bank, N.J., brokerage's database and networks. He previously worked at AT&T Corp.

Larry L. Thomas is the new vice president of IS at **Electronic Clearing House, Inc.** Thomas has held management positions at Unisys Corp. and Burroughs Corp. He is also an author and speaker on wireless communication standards and Internet-related subjects. Located in Agoura Hills, Calif., Electronic Clearing House is a provider of point-of-sale equipment, credit-card processing and check guarantee services.

Kenneth Craig was named vice president and CIO of **Philips Consumer Electronics Co.** in Knoxville, Tenn. The company is a division of Dutch giant Philips Electronics N.V. Craig led a double life at his last job: He served as president of SAP Brazil, while he was a managing director at Origin Technology and Business, Inc. in Murray Hill, N.J.

Ann C. Sullivan was named CIO at **Maimonides Medical Center**, a hospital in New York. She was formerly the hospital's chief operating officer and chief financial officer.

The **National Association of State Information Resource Executives** has announced the following appointments among its members: **Doug Couto** has been named Information Management Coordinator for **Iowa.** This is a new position within the Department of Management. **John McDowell** has been appointed deputy director of the **Arizona Information Resources Management Group.**

May workshops

A listing of workshops for IS managers. Most workshops are also offered later in the year in other cities. To find the time and location most convenient for you, call the contact phone number.

Communicating with IS Clients and Customers. Boston, **May 2-3** — Fee: $750. Contact: QED Information Sciences, Inc., Wellesley, Mass. (800) 395-1109.

Systems Analysis and Design for Information and Business Professionals. Los Angeles and Princeton, N.J., **May 6-9** — Fee: $1,350 to $1,550. Contact: American Management Association, New York, N.Y. (800) 262-9699.

Connecting to the World Wide Web. Philadelphia, **May 7-8**; Dallas, **May 13-14**; Boston, **May 20-21** — Fee: $895. Contact: Data Tech Institute, Clifton, N.J. (201) 478-5400.

The Crossing the Chasm/Inside the Tornado Seminar Series. Chicago, **May 7-8** — For managers and those incorporating information technology in the enterprise. Fee: $1,285 to $1,395. Contact: Marketwise, Inc., Boulder, Colo. (800) 300-3846.

Business Process Re-engineering: Strategies, Techniques and Tools. Washington, **May 7-10** — Fee: $1,995. Contact: The Learning Tree International, Inc., Reston, Va. (800) 843-8733.

Information Management: The Next Generation. Boston, **May 7-10** — Fee: $475 to $1,950, depending on days attended. Contact: Delphi Consulting Group, Boston, Mass. (617) 247-1025.

Project Management: Skills for Success. Washington, **May 7-10** — Fee: $1,995. Contact: The Learning Tree International, Inc., Reston, Va. (800) 843-8733.

Software Engineering for Project Managers. Philadelphia, **May 9-10** — Fee: $650 to $750. Contact: Project Management Institute, Upper Darby, Pa. (610) 734-3330, ext. 17.

How to Manage, Motivate and Coach Support Professionals. Dallas, **May 13-14** — Fee: $595 to $695. Contact: Help Desk Institute, Colorado Springs, Colo. (800) 248-5667.

Workflow: Joining the Islands of Automation. Boston, **May 13-14** — Fee: $1,095 to $1,295. Contact: Delphi Consulting Group, Boston, Mass. (617) 247-1025.

Communication and Interpersonal Skills: A Seminar for Technical Professionals. Chicago, **May 13-15** — Fee: $1,195 to $1,375. Contact: American Management Association, New York, N.Y. (800) 262-9699.

Re-engineering the Computer Help Desk. Phoenix, **May 14-15**; San Francisco, **May 16-17** — Fee: $895. Contact: Data Tech Institute, Clifton, N.J. (201) 478-5400.

Joint Application Development Facilitation & Methodology Using Object-Oriented Software Engineering Seminar. Greenwich, Conn., **May 14-16** — Fee: $1,475. Contact: Pierson Applications Development, Inc., Stamford, Conn. (203) 322-1606.

Identifying and Confirming User Requirements. Los Angeles, **May 14-17** — For those responsible for identifying user needs in a project. Fee: $1,995. Contact: The Learning Tree International, Inc., Reston, Va. (800) 843-8733.

Specifying and Managing Software Requirements. Santa Clara, Calif., and Washington, **May 14-17** — For project managers developing requirements specifications. Fee: $1,995. Contact: The Learning Tree International, Inc., Reston, Va. (800) 843-8733.

Information Systems Project Management. Minneapolis and Princeton, N.J., **May 15-17**; San Antonio, **May 20-22**; Newport Beach, Calif., **May 22-24** — Fee: $1,295 to $1,490. Contact: American Management Association, New York, N.Y. (800) 262-9699.

Strategic IS Planning. Los Angeles, **May 15-17** — For senior managers. Fee: $1,350 to $1,550. Contact: American Management Association, New York, N.Y. (800) 262-9699.

Consulting Skills for IS Professionals. Detroit, **May 16** — Fee: $345. Contact: Karten Associates, Randolph, Mass. (617) 986-8148.

Understanding Client/Server Computing: Planning, Designing and Implementing a Client/Server System. Somerset, N.J., **May 16-17** — Fee: $895. Contact: Data Tech Institute, Clifton, N.J. (201) 478-5400.

Quality Review Techniques for Information Technology Professionals. New York, **May 20-21** — Fee: $1,195 to $1,375. Contact: American Management Association, New York, N.Y. (800) 262-9699.

Measuring and Controlling Software Projects. Chicago, **May 20-22** — Fee: $845 to $945. Contact: Quality Assurance Institute, Orlando, Fla. (407) 363-1111.

Negotiating Skills for Technical Managers and Professionals. Los Angeles, **May 21-24** — Fee: $1,995. Contact: The Learning Tree International, Inc., Reston, Va. (800) 843-8733.

Implementing Major Change: The Human Dimension of Re-engineering. Waltham, Mass., **May 22-23** — Fee: $1,500. Contact: Hammer and Co., Cambridge, Mass. (617) 354-5555, ext. 106.

Improving Your Internal Consulting Skills: For IS Professionals. Chicago, **May 22-24** — Fee: $1,295 to $1,490. Contact: American Management Association, New York, N.Y. (800) 262-9699.

Managing Telecommunications: Technologies Your Company Can't Do Without. New York, **May 23-24** — Fee: $1,250 to $1,435. Contact: American Management Association, New York, N.Y. (800) 262-9699.

Calendar announcements should be submitted at least eight weeks prior to the event and include the title of the event, dates, location, theme or focus, keynote or major speakers, principal topics and a contact person, organization and phone number.

SEND ANNOUNCEMENTS TO:

Steve Ulfelder, Computerworld, 500 Old Connecticut Path, Framingham, Mass. 01701 Fax: (508) 875-8931

Buyer's Guide: Client/ Re-tooling

A new generation of client/server development packages promises to help corporations build applications that reach beyond the workgroup. Vendors hope to address user demands for transaction processing, integration of legacy applications and heterogeneous networks.

By Alan Radding

The enterprise has emerged as a mecca for vendors of client/server development tools.

Sensing that client/server development is about to be rolled out in large-scale applications, vendors have slapped the enterprise label on almost any tool in hopes of tapping in to the high-end tool market. That market is projected to hit $3 billion by 2000, according to Hurwitz Consulting Group, Inc. in Newton, Mass.

Tool vendors are also rushing to add 32-bit support so their tools will work with Microsoft Corp.'s Windows NT and Windows 95. "We're going through a redefinition period right now," says Dick Heiman, a senior analyst for application development tools at International Data Corp. (IDC) in Framingham, Mass.

Outdated definitions

The traditional classifications identify a tool as workgroup/departmental or enterprise. But these labels no longer serve as a useful guide because development projects fall along the spectrum between workgroup and enterprise.

Even the term "enterprise" has taken on new meaning. Enterprise used to mean mainframe, says Brent Williams, research director of application development technologies at Gartner Group, Inc. in Stamford, Conn. The tools are often associated with mainframe computer-aided software engineering (CASE). They have used extensive formal methodologies and have provided full lifecycle application development — from analysis and design to code production and deployment.

Today, enterprise means large-scale projects, with or without a mainframe. The new enterprise tools often have analysis and design features, multiplatform capabilities, team management facilities and code partitioning for scalable deployment, says David Kelly, director of application development service at Hurwitz Consulting.

Other characteristics include support for mission-critical, transaction-oriented production applications through features such as two-phase commit, integration with transaction monitors and tools for team and systems management.

Workgroup/departmental applications, on the other end of the scale, refer to small applications that support one, a few or up to several dozen users. "You might push these tools further depending on the developer's skills," Williams says.

The tools, which primarily are SQL-centric, are used to create graphical database applications that access back-end relational databases. They build fat client applications, where the application logic is buried under graphical user interface (GUI) components. They swap fast, iterative prototyping for extensive up-front analysis and design.

Client/server development is moving past smaller workgroup applications, but not every organization is ready to embark on large-scale, mission-critical client/server production. To be useful, a client/server tool taxonomy needs to provide more options. Traditional workgroup/departmental and enterprise classifications are still valid, but IDC has added a Division group that is beyond workgroup/departmental but isn't quite enterprise. A miscellaneous category covers special cases.

The summary on pages 90, 91 and 92, compiled from interviews with consultants at IDC, Hurwitz Consulting and Gartner Group, considers how some tools fit within such a taxonomy and describes the high points and key features of each tool.

Radding is a freelance writer in Newton, Mass.

What's inside:

Hurwitz Consulting Group's David Kelly homes in on the core functions of high-end client/server development tools. *Page 94*

COMPUTERWORLD BUYER'S SATISFACTION SCORECARD

See how users rate the top **workgroup tools**, in our Buyer's Satisfaction Scorecard. *Page 96*

FIRING LINE

Java developers discuss the hot language everyone else is talking about, in Firing Line. *Page 98*

Enterprise

Seer HPS
Seer Technologies, Inc.
Cary, N.C.
(800) 499-7337
http://www.seer.com
With its roots in the mainframe world, Seer HPS (High Productivity System) offers the full life cycle of client/server application development, including analysis, design, deployment, testing and configuration. The tool isn't expressly object-oriented, but it lets developers work with modular pieces of code that have some object-oriented characteristics, such as inheritance.

It includes a repository (a central place to store objects) and messaging middleware (which helps objects communicate among themselves).

Dynasty 2.0
Dynasty Technologies, Inc.
Lisle, Ill.
(708) 769-8500
An object-oriented fourth-generation language (4GL) pioneer, Dynasty 2.0 includes four partitioning schemes, Tuxedo-compatible code generation (for use with Novell, Inc.'s Tuxedo transaction monitor), support for two-phase commit (a technique for ensuring the integrity of distributed transactions) and asynchronous messaging.

Dynasty 2.0 also has expanded its database.

It lets developers build large-scale applications by using high-level, reusable business objects and rules. An automatic code generator cranks out partitioned C code, SQL statements and remote procedure calls to create a complete application.

Server Development Tools

for the enterprise

Client/server development terms

Tiers: The levels of a computing architecture at which various services can be executed. Many vendors promote a three-tier architecture that includes a presentation tier, an application services tier and a data services tier.

Partitioning: The process by which a developer breaks an application in pieces and specifies which part will run on a client or any of several servers.

Controls: Independent parcels of code that can be dropped in to a developer's on-screen workspace. They allow reuse of code to provide basic functions.

Inheritance: A process by which developers can reuse code by referring to an existing parcel of code rather than copying or rewriting source code. Using inheritance, most functions performed by a software component will remain untouched; new or modified functions are written as code.

Properties box: A pull-down box containing elements that describe the functions or appearance of a software control or other object. The box lets a developer change details of how a control will appear on-screen or specify links with other application elements.

Interpret: To execute a program by examining and performing each line of source code in a high-level language at runtime. Applications built with some development packages may be limited to running in interpreted mode.

Forte 2.0

Forte Software, Inc.
Oakland, Calif.
(510) 869-3400
http://www.forte.com

This tool introduced scalable object technology to large-scale client/server development. Forte 2.0 includes an object repository and an object-oriented graphical 4GL that relieves the developer from wrestling with C++. Through the repository, Forte 2.0 provides team management capabilities and automatically creates three-tier applications.

Forte recently integrated analysis and design capabilities with the development environment.

Passport 8.0

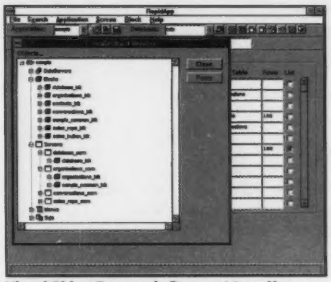
Passport Corp. (formerly InSync Software Corp.)
Ronkonkoma, N.Y.
(516) 981-3000

Passport often is overlooked, but the tool handles large-scale, event-driven and real-time applications particularly well through a specialized event handler.

The event handler will let developers create a single generic piece of event-processing logic for all objects instead of requiring developers to create event-processing logic for each object.

Passport 8.0 separates logic code from the object, which makes it possible to reuse objects and logic code separately. Developers can write and maintain specialized event logic.

Passport 8.0 also generates native compiled code, which results in high performance.



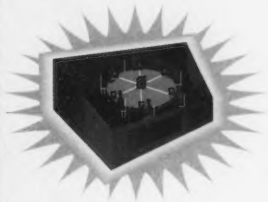
Visual Object Browser in Passport 8.0 *offers a hierarchical view of objects*

Composer 3.0

Texas Instruments, Inc.
Plano, Texas
(800) 838-1843
http://www.ti.com

With Composer 3.0, Texas Instruments has transitioned its mainframe-oriented, CASE-based development tool — Information Engineering Facility — to client/server computing. Composer 3.0 combines analysis and design tools with a code generator and middleware. Developers work with objects that represent familiar high-level business entities, such as a customer. Composer 3.0 combines traditional information engineering tools with rapid development.

The tool was created for very large-scale development. Developers don't have to do any coding. All development is done through various design components. Composer 3.0 automatically generates all the code, including the user interface, business logic and database.



Workgroup/ Departmental

SQLWindows (16-bit version)
Centura (32-bit version)

Gupta Corp.
(now Centura Software Corp.)
Menlo Park, Calif.
(800) 876-3267
http://www.gupta.com

Although it often bested Powersoft Corp.'s PowerBuilder in functionality, SQLWindows never could win market share. With its built-in database, repository, team management facilities and extensive use of object technol-

Re-tooling for the enterprise, *page 92*

Re-tooling for the enterprise

CONTINUED FROM PAGE 91

ogy, SQLWindows is an effective departmental rapid application development (RAD) tool loaded with ease-of-use features. Centura, the 32-bit version, has support for partitioning, which gives it improved scalability.

Delphi 2.0

Borland International, Inc.
Scotts Valley, Calif.
(800) 331-6877
http://www.borland.com

Borland raises the ante for Visual Basic with Delphi 2.0. Both tools compete in the low-end graphical database access application market. Delphi's trump card has been its better use of object technology and its scalable database architecture based on Interbase Software Corp.'s relational database management system engine.

Delphi is stretching into enterprise space by adding an object repository, an open application programming interface (API) to allow integration with third-party design tools, a library of reusable components and a data dictionary.

PowerBuilder 4.0

Powersoft Corp.
Concord, Mass.
(800) 395-3525
http://www.powersoft.com

PowerBuilder defined the client/server RAD market. This version lets developers build solid workgroup/departmental database access applications. It supports a measure of partitioning and limited object capabilities, which lays the foundation for more comprehensive object support in the future. Its integration with S-Designor gives the tool design and analysis abilities.

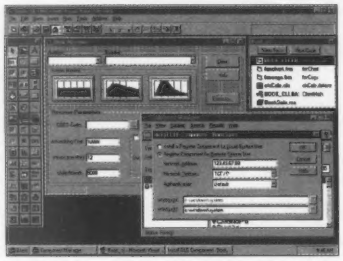
PowerBuilder 5.0, *which is due this year, features new levels of OLE control integration*

Visual Basic 4.0

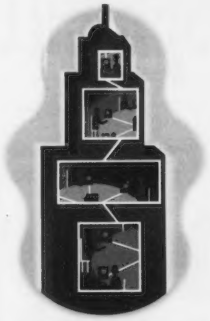
Microsoft Corp.
Redmond, Wash.
(800) 426-9400
http://www.microsoft.com

The quintessential workgroup tool, even Visual Basic aspires to enterprise status. It builds graphical, large-scale, database access applications. Visual Basic Enterprise Edition 4.0 features Data Access Objects, Microsoft's Jet 3.0 database engine, remote automation, Object Database Connectivity (ODBC), ODBC API and remote data objects that expand the tool's database access capabilities.

The additions were intended to address complaints that the tool wasn't sufficiently database-aware. It's highly debatable whether the improvements elevate the tool to enterprise class.



Visual Basic 4.0 *has a component manager tool that helps users access remote OLE servers*



Division

Progress 8.0

Progress Software Corp.
Bedford, Mass.
(617) 280-4000
(800) 477-6473
http://www.progress.com

Progress Software Corp. is known primarily as a relational database vendor. Its Progress 8.0 provides developers with an extended version of the company's 4GL.

Progress 8.0 features SmartObjects, a graphical component structure and a mechanism for building and linking those objects.

Progress 8.0 also includes eight prebuilt, database-aware SmartObjects, which encapsulate business logic such as queries.

Support for 32-bit code and partitioning are promised for the future.

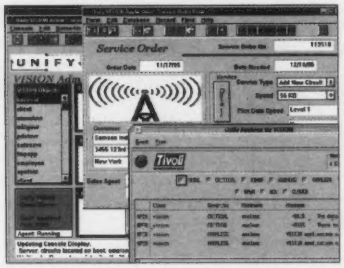
Uniface 6.0

Compuware Corp.
Farmington Hills, Mich.
(800) 365-3608
http://www.compuware.com

Uniface 6.0 is a powerful development environment. The product makes extensive use of modeling to separate interface, business logic and database components, which forms the basis of partitioning.

It offers robust database access through a set of native database drivers.

Uniface 6.0 also lets developers build industrial-strength transaction processing applications through support for several transaction processing monitors.

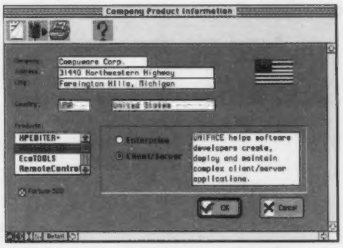


Uniface 6.0 applications *reflect the native look and feel of several interfaces*

Vision 2.1

Unify Corp.
San Jose, Calif.
(800) 248-6439
http://www.unify.com

This tool, known for its Unify 2000 database and command line 4GL, is graphical. It provides automated partitioning, team management and an object repository. An open messaging API and global and local naming services allow the application to efficiently use components that are distributed across the network.



Vision 2.1 *features built-in functionality that eliminates a lot of code writing for developers*

Special cases

Magic 6.0

Magic Software Enterprises, Inc.
Irvine, Calif.
(800) 345-6244
http://www.magic/sw.com

Magic 6.0 is a highly efficient rapid application development tool for building complex, portable client/server applications.

Magic 6.0 was based on a unique approach to software development in which the underlying code is highly abstract.

The code is represented as entries in a database table. The resulting application is a database file in which the definitions, specifications and values of the application — including the layout of the screen to business rules — are stored as data in tables.

At runtime, the Magic 6.0 engine steps through the file to execute the application.

The benefit of this approach is that users can develop fast, code-free applications that can be ported easily to any platform for a Magic 6.0 engine.

Elements Environment 2.0

Neuron Data, Inc.
Mountain View, Calif.
(415) 528-3450
http://www.neurondata.com

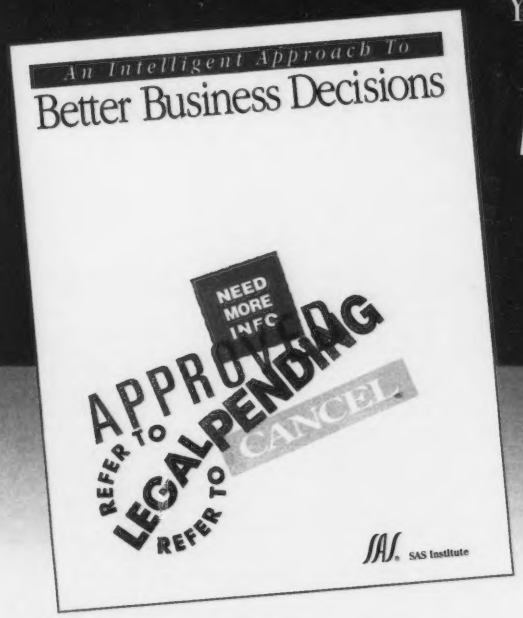
Neuron Data's Elements Environment 2.0 falls in the special cases category because it has components from four areas: GUI development, data access, business rules and interprocess communications.

The components are linked by a set of integration facilities, which includes visual editors, an extensible script language, C and C++ interfaces and low-level, portable application services.

The environment is delivered in a set of four tool products.

Neuron Data employs a messaging facility that operates the same way as an object request broker, which lets developers create scalable, distributed, multitier partitioned client/server applications.

Elements Environment 2.0 provides a complete object-oriented environment and generates compiled C++ code.



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Core functions of high-end tools

By David Kelly

Enterprise client/server application development tools come with a bewildering array of capabilities and functions. Understanding what each one does, let alone comparing them, can be an arduous task made more difficult by confusing marketing hype.

Businesses should evaluate tools by building a clear understanding of their company's business and technical problems. From this understanding, craft a list of minimum technical specifications. Use this list to identify enterprise application development tools that provide the needed functionality. To make your purchase easier, consider the following high-level capabilities:

• **Analysis and design capabilities.** The task of embedding business rules in a large-scale application can demand a level of functionality that is difficult to achieve with a simple, graphical, ad hoc prototyping approach. Enterprise-level tools should include a built-in analysis and design component or interfaces to third-party tools. Without some form of analysis and design functionality, enterprise development efforts most likely will spin out of control or create poorly understood business-critical applications that will prove unmanageable and difficult to modify as a business grows and changes. Analysis and design tools become an important way for developers to share application designs quickly. This is a key consideration as the scale of a project and its financial risk grow.

Questions to ask:

Does the tool require or support a specific methodology?

Does it support third-party, object-oriented and non-object-oriented analysis and design tools?

If so, are the interfaces bidirectional? (That is, are changes made in the development environment reflected in the analysis or design environment?)

• **Repository.** A repository is centralized storage for application designs, business rules and programs. A repository is essential to control a large-scale or complex project. A full-featured repository should include tools that let developers graphically browse and select application components. To facilitate team development, a repository should include version control and configuration management capabilities. This lets managers implement controlled builds of applications and review developers' work to identify training needs and productivity patterns.

David Kelly: *Design and analysis functions are crucial*

Questions to ask:

Can outside objects (C++ code, OLE controls) be stored and used in the repository?

Is the repository proprietary or can standard relational database management systems be used?

How well does the tool support third-party version control systems?

• **Database integration.** Data is the linchpin of almost every business application. The way a development environment interacts with database management systems is key in determining an application's performance and functionality. A high-end development tool should automatically generate most of the data-handling logic needed to specify and control transactions. It should also let developers modify or add their own highly tuned, data-handling logic. Some tools automatically generate database tables and structures. This lets developers focus on creating applications rather than becoming experts on relational database theory.

Questions to ask:

Can you modify or override generated SQL?

Can the tool automatically generate SQL?

Does the tool require you to write SQL?

• **Application management facilities.** In a distributed environment, system operations personnel need explicit tools and explicit logic within applications to guarantee the reliability and integrity of applications, gather performance information and troubleshoot runtime problems.

Systems management staff must be able to coordinate with developers to manage application upgrades or modifications — from finalizing the configuration of runtime executables for deployment scenarios to automating the distribution of software across a network to target PCs. The development environments should support developer efforts to create management hooks and developers' error-handling and performance collection.

Questions to ask:

Can the tool generate Simple Mail Transfer Protocol events or traps?

What events and parameters can the tool monitor?

What release and distribution mechanisms does the tool provide? ■

Kelly is director of the application development service at Hurwitz Consulting Group, Inc. in Newton, Mass.

Tools, tools and more tools

There are other client/server tools that you may want to consider. Most are enterprise-oriented, but a few are departmental.

Omnis
Blyth Software, Inc.
Foster City, Calif.
(800) 346-6647
http://www.blyth.com

NatStar
Nat Systems International, Inc.
McLean, Va.
(703) 620-9200
http://www.natsys.com

SuperNova
Four Seasons Software, Inc.
Edison, N.J.
(800) 949-0110
http://main.street.net/4s

Obsydian
Synon Corp.
Larkspur, Calif.
(800) 947-9666
http://www.synon.com

ObjectStar
Antares Alliance Group
Dallas
(214) 447-5500
(800) 416-2888

Galaxy
Visix Software, Inc.
Reston, Va.
(800) 832-8668
http://www.visix.com

Enterprise Developer
Symantec Corp.
Cupertino, Calif.
(800) 441-7234
http://www.symantec.com

Jam 7
JYACC, Inc.
New York
(800) 458-3313
http://www.jyacc.com

Entera
Open Environments Corp.
Boston
(800) 562-5969
http://www.openenv.com

CA-OpenROAD
Computer Associates International, Inc.
Islandia, N.Y.
(800) 225-5224
http://www.cai.com

VisualAge
IBM
Somers, N.Y.
(800) 426-3333
http://www.ibm.com

Visual SmallTalk Enterprise
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Sunnyvale, Calif.
(800) 759-7272
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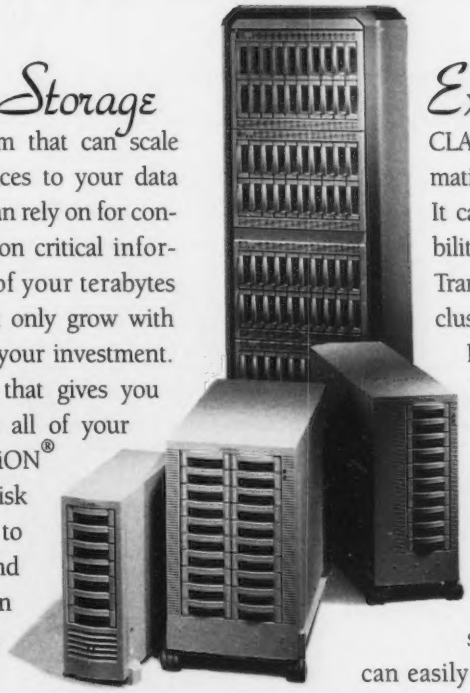

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COMPUTERWORLD BUYER'S SATISFACTION SCORECARD

Delphi delivers the goods

Delphi Client/Server	*PowerBuilder 4.0*	*Visual Basic 4.0*	*SQLWindows 5.0*
Borland International, Inc.	**Powersoft Corp.**	**Microsoft Corp.**	**Centura Software Corp. (Gupta Corp.)**
Scotts Valley, Calif.	**Concord, Mass.**	**Redmond, Wash.**	**Menlo Park, Calif.**
(800) 233-2444	(800) 395-3525	(800) 426-9400	(800) 876-3267
http://www.borland.com	http://www.powersoft.com	http://www.microsoft.com	http://www.gupta.com
(42 users surveyed)	**(50 users surveyed)**	**(50 users surveyed)**	**(50 users surveyed)**

By Kevin Burden

The new kid on the block is having an impact.

Borland International, Inc.'s Delphi has been in the client/server development tool market for only a year. But Delphi has satisfied its users more than competitors have because it is the first tool to include features that developers need to build faster stand-alone applications — ones that don't require runtime modules such as a code compiler.

Satisfaction ratings for other packages — including Microsoft Corp.'s Visual Basic 4.0, Powersoft Corp.'s PowerBuilder 4.0 and Gupta Corp.'s SQLWindows 5.0 — are noticeably lower than Delphi's, but still positive. All four vendors are replacing their products with new versions; for example, Delphi 2.0 recently started to ship.

Computerworld contracted First Market Research Corp. in Austin, Texas, to survey at least 40 users of each client/server product. The goal was to find out what factors led users to choose a client/server product and how well the package has performed.

Delphi Client/Server Suite

Client/server development tools have matured in the past several years, which is why it's been rare for one to receive an "A" for overall satisfaction from half its users. But Delphi Client/Server edition came very close this year.

Borland has pioneered a RAD paradigm with Delphi that runs faster and produces applications that perform better and don't require a runtime module. Delphi's approach combines a visual design environment with an object-oriented language. But the key that will further unleash its performance is a true native-code compiler that Borland has added to Delphi 2.0. It will compile its Pascal source code directly into machine code.

When we asked users what led them to their development package, only Delphi users listed "speed of developed applications" among their Top 5 reasons.

"We develop application suites, so performance is very important to us," says Jeff Carlson, manager of systems research and development at Quintiles, Inc. in Research Triangle Park, N.C. "And what we've built with Delphi runs faster than any application we built with other tools."

A consistent interface also has contributed to the atmosphere of developer friendliness. Users of all four products ranked "ease of use by developers" as their first or second most critical reason for their product much, to the relief of some users. Most of what is different are the new Windows 95 controls, such as the right-click of the mouse.

Users speak

How would you rate your overall satisfaction with your development package?

	Very Good	Good	Average
Delphi	48%	40%	7%
Visual Basic	38%	48%	4%
PowerBuilder	26%	50%	16%
SQLWindows	10%	60%	24%

(Percentage of users. Some users offered no opinion or gave "poor" grades.)

Would you choose the same product again?

	Yes	No
Delphi	81%	5%
Visual Basic	78%	18%
PowerBuilder	60%	24%
SQLWindows	58%	22%

(Percentage of users. Remaining users were undecided)

Visual Basic 4.0

Visual Basic 4.0 applications have the same lethargic performance that users of previous versions have complained about, but Release 4.0 represents enough of an improvement over Release 3.0 that 86% of the users surveyed gave the product favorable grades for overall satisfaction.

The consensus showed that users are happy about how Microsoft has changed Visual Basic to meet market needs. Some of the tool's most notable improvements include 32-bit support, a shift from Visual Basic controls to OLE controls and the introduction of Remote Data Objects and Remote Data Control — data access objects optimized for Oracle Corp. and SQL Server databases.

The interface wasn't changed choice. But Visual Basic had the most users (17) who ranked it first, and all gave the product an "A" or "B."

PowerBuilder 4.0

Overall satisfaction scores show that Powersoft's PowerBuilder 4.0 could be past its prime. Version 4.0 has been on the market since 1994, which means it lacks hot technologies such as custom controls or compiled code. "It needs to improve with new features," says Gregory Corbin, a senior systems analyst at Glaxo Welcome, Inc. in Research Triangle Park.

In past Buyer's Scorecards, PowerBuilder placed first or second in the satisfaction ratings. Its scores tended to closely match Visual Basic's. Its current scores are still mostly positive but aren't in the same class as Visual Basic's or Delphi's. "It's like everything is passing it," Corbin says.

The good news is PowerBuilder 5.0 is on the way. It is scheduled for release in the second quarter.

Version 5.0 will include Watcom International Corp.'s C compiler engine, which turns PowerBuilder applications into machine-code executable files. Watcom is a sister company of Sybase-owned Powersoft. Version 5.0 also will support three-tier architectures and OLE controls, which makes it more similar to Delphi.

SQLWindows 5.0

For the second straight year, Gupta Corp. (now known as Centura Software Corp.) finished last in user satisfaction ratings with its SQLWindows.

But until the release of Delphi, Visual Basic 4.0 and soon PowerBuilder 5.0, SQLWindows 5.0 arguably was the more powerful development environment of the bunch. Part of its problem is "it's never been intuitive enough that I would say it's easy to use," says Tori Rosenthal, a business administrator at Micro Motion, Inc. in Boulder, Colo.

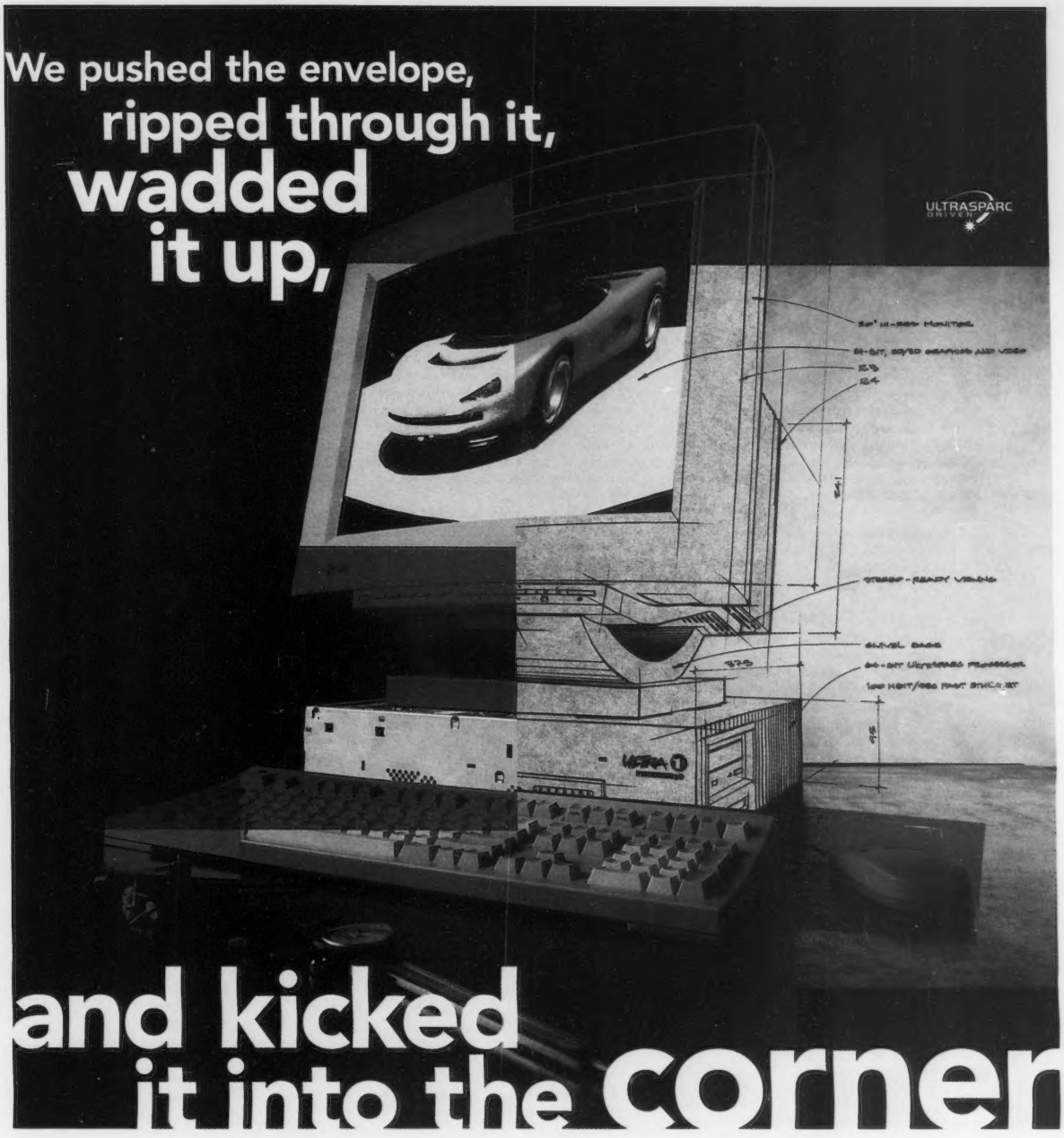
Gupta also had the fewest users who said they would buy the same product again. But more than just functionality is influencing that decision, users say. "Their financial stability is a real concern for us," says Marshall Miller, a systems programmer at Grant County Public Utility District in Ephrata, Wash. Gupta hasn't posted a profitable quarter since the fourth quarter of 1993.

Gupta also is concentrating on Centura, a 32-bit enterprise client/server development package that it will release this month. Gupta named the 32-bit tool after itself to indicate its commitment to the next generation of application development.

Gupta says it will still support the 16-bit SQLWindows 5.0, but several users interviewed said they would rather use the product that gets most of the vendor's attention. ■

Interface Manager

We pushed the envelope,
ripped through it,
wadded
it up,



and kicked
it into the corner

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Java needs time to mature

By Kevin Burden

Does Java deserve its hype? Sure, users say. But since it's the only language that does what it does, users are willing to accept some of its idiosyncrasies.

Java is Sun Microsystems, Inc.'s object-based development language that lets developers build applications that can be circulated over the Internet and run anywhere in a highly distributed network.

Java applications are platform-independent, but differences between Java and Netscape Communications Corp.'s Netscape browser prevent applications from looking the same across all platforms.

"Run our Wall Street [World Wide Web] page on a Windows 95 box [with Netscape], and it will look different than it does on a Sun Solaris system," says Scott Milener, CEO of BulletProof Corp. in Los Gatos, Calif. The problem, according to users such as Milener, is rooted in Netscape's interpretation of the Java language.

And Java development tool kits are very primitive, users say. But for those who consider the tools completely useless, building their own tools is an acceptable alternative, "if that is what it takes to use Java," Milener says.

Four Java developers were asked to rate their satisfaction with the language in several areas. The developers' firms include BulletProof, Strategic Technology Resources, Century Computing, Inc. and Mitsubishi Electric Corp.

Ease of use

Learning Java is easiest for C++ programmers, since Java essentially is C++ without some of the hazardous functions that get developers in trouble — pointers, for example.

Experience with C++ syntax helps developers, but knowing the fundamentals of object-oriented programming is a definite prerequisite, according to Larry Podmolik, director of technology at Strategic Technology Resources in Chicago. "Learning syntax is one thing; grasping entire concepts is quite another," he says.

The biggest obstacle for everyone who wants to learn Java is the industry's lack of experience with it. Milener says his learning curve was quite steep for the first few months. There were no training classes or experts with whom to consult. "We just learned by trial," he says.

Java is easier to learn than C++ because Sun included only those functions that are absolutely necessary. "C++ has every function you could want, but you have to learn them all, too," Podmolik says. But there are some functions that developers sorely miss in Java, including templates. With templates in C++, developers can create families of related class files by writing the class only once. In Java, each class file has to be written individually.

Besides being functionally lighter, Java is easier to use because of its modular building style, which makes team development more manageable and application changes less dangerous. "Bugs only affect the module they are in, so it's impossible to screw up the rest of the program by making changes or adding functionality," Milener says.

Development Tools

The Java Development Kit from Sun was adequate for two of the users, but the other two said they needed to build their own tools.

"Its debugger is horrible," Milener says. He says he developed his own tool set after testing some stock sets. "Same with Borland [International, Inc.'s] Java tool kit — it's downright unprofessional," he says. "It looks like they rushed it out the door." None of the users had tested Symantec Corp.'s tool kit, Espresso.

Everyone agreed the compiler included in the Java Development Kit worked well. "It's more stable than most production C++ compilers we've used," said Steve Clark, software engineer at Century Computing in Laurel, Md. Java code is compiled for efficiency, and it's done so that it won't be specific to any system. Java applications remain platform-independent in this way. Podmolik says he misses having a drag-and-drop tool for building graphical interfaces when using Java vs. more mature environments. Java screens are designed by writing code.

But third-party tools such as JFactory from Rogue Wave Software, Inc. in Corvallis, Ore., are expected to help.

Application Performance

The four developers said they are satisfied with the performance of their Java applications but that there is still room for improvement.

"Performance is fine for interactive GUI applications, but Java isn't good enough for high-volume servers right now," Podmolik says. It won't be ready until a just-in-time compiler is released, he says.

The download time for Java applets needs a lot of attention, users say. The time it takes to download a Java application depends on a network's bandwidth, "but no attention has been given to compressing the information before it comes over the wire," Milener says. ■

Books

Client/Server Strategies
By David Vaskevitch
$29.95
IDG Books Worldwide, Inc.
(800) 762-2974

Real World Client/Server
By Steve Krantz
$29.95
Maximum Press
(800) 989-6733

Client/Server Technology for Managers
By Karen Watterson
$17.95
Addison-Wesley Publishing Co.
(800) 822-6339

Conferences, etc.

Client/Server Application Packages
April 10-12
Toronto
Contact: Digital Consulting, Inc.
(508) 470-3880

Designing Distributed Client/Server Systems
April 17-19
Chicago
Contact: Digital Consulting, Inc.
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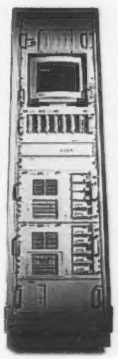

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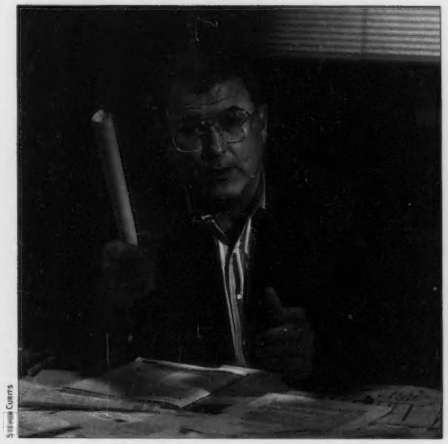
In Depth

Is OOP right for enterprise IS?



Steven Coers

By John A. Strand III

YES!

Object-oriented programming (OOP) is not only viable for building enterprisewide applications — it's preferable. As a matter of fact, at Sprint, we're re-engineering our entire enterprise to be object-oriented.

IF you ever used Lincoln Logs, Legos or Tinker Toys when you were a child, you understand object orientation. Using Lincoln Logs, you could build a cabin, dismantle it and reuse the components to build a fort. Prefabricated parts were the heart of the Industrial Age; prefabricated objects, components and software-integrated circuits are the heart of the Information Age. Without them, software development can't move forward as a healthy, thriving entity. It's amazing that these simple concepts can't be grasped, because they are intuitively obvious.

At Sprint Corp., not only are we using OOP to build new enterprisewide applications, but we're also distributing and sharing objects enterprisewide via object request brokers — such as San Diego-based Expersoft Corp.'s PowerBroker — to dispel our legacy nightmare with a distributed, heterogeneous information infrastructure. This gives us the ultimate vendor leverage — because we have no proprietary dependencies — as well as object interoperability with our partner enterprises.

Objects have many ramifications for information systems throughout the enterprise. Several facets of OOP require a fun-

Yes, *page 102*

Strand is director of technology planning and integration at Sprint Corp. in Overland Park, Kan.

SOUND OFF!

AT ISSUE:

Object-oriented programming is billed by some as the answer to corporate America's software development problems. OOP promises to help companies save time, resources and money, they say, by quickly creating fully functioning enterprise applications from predefined autonomous objects. But skeptics point to steep learning curves, dashed hopes and compatibility problems. Who's right?

Reinhold Spreiler

By Martin A. Goetz

ABSOLUTELY NOT

With the inevitability of death and taxes, classic OOP, as defined in the mid-1980s, will fail as a programming paradigm for building information systems enterprise applications. Organizations that try to live by classic OOP will die by it.

WHAT are some of the characteristics of "classic" OOP? The OOP implementation is in an OOP language such as C++ or Smalltalk. An object's logic and variables are encapsulated together. The OOP implementation uses the top-down hierarchical model for defining object classes and dependencies. Business logic is put into individual methods in a class hierarchy. The objects inherit functionality higher in the hierarchy.

This isn't the profile of a paradigm that will succeed.

Don't get me wrong. I'm all in favor of finding new and productive ways to build IS applications. Heaven knows we need them. But OOP isn't the answer. For every OOP success story you've read, there are 50 failures that have been shoved under the computer room floor. For every IS Cobol professional who has successfully adapted to OOP, there are 50 others who, after months of training and trying, still don't understand how to apply OOP theory successfully.

Just last month, *Computerworld* ran a story on Page 1 that de-

Absolutely not, *page 102*

Goetz is president of Goetz Associates in Teaneck, N.J. As founder and past president of Applied Data Research, Inc., he has been an advocate of new application development technology for more than 30 years.

YES!

CONTINUED FROM PAGE 101

damental change in the way large companies approach software. It's important to understand these aspects of OOP and how they mandate both cultural change and a difficult but achievable paradigm shift throughout the enterprise.

Encapsulation is a key aspect of OOP that brings all information pertaining to a particular real-world object, such as a customer, into a single "digital master" object. This master object resides in a virtual object warehouse that is accessible by applications throughout the enterprise. This encapsulation represents an enormous cost savings and increase in efficiency on maintenance costs alone, not to mention improved accuracy and better customer service.

By contrast, a legacy system may keep some information about a customer in one database and other information about the same customer in another database.

Additionally, the same information about a given customer is typically in more than one database, but each may contain mistakes. To make matters worse, the databases are sometimes proprietary or homegrown, difficult to integrate and require large maintenance staffs.

Encapsulation also prevents brittle "rat's nest" code by reducing assumptions, thus supporting rapid changes to applications. New tools are available, such as one from Apertus Technologies, Inc. in Eden Prairie, Minn., that we're using to perform automated mappings from flat or relational databases to objects. These tools provide ways to achieve legacy database migration sooner rather than later.

One of the most often noted advantages of OOP is software reuse. It's a benefit of huge proportions because it slashes development time and, therefore, costs. Where software development managers sometimes go wrong is in selling reuse as a silver bullet. These managers often are unwilling to schedule the extra time required to create reusable code.

True object-oriented languages such as Smalltalk and Java support reuse by means of inheritance. If you've already written the code for a general class of "ball" objects, you don't have to rewrite that code for subclasses such as "baseball" or "golf ball." You write only the code that's different for each subclass — "has seams," for instance, or "has dimples." Due to inheritance, reuse appears as a by-product during normal development in OOP.

STRAND:

"OOP's detractors are those who stand to lose the most: control-centric empire builders evaluated on the size of their staffs, not on their savings to the enterprise."

When IS is chartered with building a new system, typically there's deep reluctance to decipher someone else's cryptic legacy code. Instead, programmers write new code or pile another layer on top of the old stuff, compounding the problem.

Contrast this with object-oriented programmers. The really good ones are part plagiarist, part artist, part systems integrator. They take objects from anywhere, reuse them, modify them if necessary and integrate them at blinding speeds. But to take full advantage of their work, a corporation needs an "object czar" who coordinates their efforts.

So why has OOP failed to gain more widespread acceptance? One reason is that it presents a serious threat to traditional IS organizations. OOP's main detractors are typically those who stand to lose the most: the control-centric empire builders who are evaluated on the size of their staffs, not on their savings to the enterprise.

Another reason is the difficulty or lack of commitment that some organizations encounter when trying to make the paradigm shift to objects. It's just this paradigm shift that OOP naysayers raise as a cause for avoiding OOP. Don't listen! This fundamental change is needed to produce significant change, and it takes time. When the promises of OOP aren't realized right away, managers blame the technology, cancel all further classes and abort halfway through the paradigm shift. Then the IS old-timers rejoice, for their jobs and empires are secure once again, and the perceived pain of learning something new goes away.

In the near future, all software will be object-oriented. The trend is obvious, with the growth of OOP languages such as Smalltalk, C++ and now Java.

The reason for this movement is that software objects mirror the real world. Records, fields and structures are computer-oriented; objects are people-oriented. After you understand objects in software the way you played with objects as a child, OOP becomes obvious.

Do you want to be on the trailing edge of this paradigm shift while your competitors are using objects to consistently maneuver inside your development cycle? We constantly hear the question, "Are objects ready for prime time?" Hell, they've been ready for years. The question is, when will IS departments be ready to embrace them? ■

ABSOLUTELY NOT

CONTINUED FROM PAGE 101

scribed Duke Power Co.'s failure to apply OOP effectively [CW, Feb. 26]. The Charlotte, N.C.-based utility abandoned its new customer information system and lost a substantial investment in the project. In the article, Oracle Consulting's Steve Perkins, who oversaw the project, acknowledged, "The object-oriented methods and tools proved not to be scalable to a problem of this size and complexity." The story went on to say, "One of the biggest problems is mapping software objects to relational database management systems."

Duke Power's experience is far from isolated. Stamford, Conn.-based Gartner Group, Inc. identified OOP's shortcomings in a 1995 report. "Object orientation is a notoriously difficult technique to master," it read, "and beyond GUI management, it is unsuitable for large, complex systems involving scores or hundreds of relational tables and for large development groups."

Just what is the problem OOP is trying to solve? For the past 40 years, the goal in IS has been to build and maintain viable enterprise applications that increase productivity, reduce maintenance costs and quickly respond to changing business needs. We've worked hard to accomplish this and gained a lot of experience along the way. But classic OOP throws this out the window. As even die-hard OOP proponents acknowledge, OOP requires a new mind-set and a unique way of thinking about the design and programming of an application.

OOP is — or should be — only a means to the end of building better enterprise IS applications. But it fails to deliver as a true advancement. Look at the evolution that took place in the past four decades: machine code, assembly language, Cobol, fourth-generation languages (4GL). Each step represented a true advance in the technology. Each successor language was easier to learn and use. In this context, it's easy to see that OOP is neither the next step nor an advance.

GOETZ:

"For every OOP success story you've read, there are 50 failures shoved under the computer room floor."

Cobol, like machine code and assembly language before it, should be retired with dignity. To replace it, Cobol programmers need objects that are easy to use and flexible enough to meet IS enterprise application requirements.

So what's the solution? It's right in front of us: enterprise 4GLs, which already are delivering the productivity gains so desperately needed. Enterprise 4GLs are easy to use and learn; use only object technology that is compatible with the building of large, complex IS applications; and have special facilities for building and maintaining distributed client/server enterprise applications.

Choosing an enterprise 4GL over a classic OOP paradigm can, therefore, represent a critical decision for success. Unlike Duke Power, Fairfax, Va.-based Mobil Oil Corp. rejected classic OOP as a basis for building a large application. Instead, it opted to build this new client/server application using Ronkonkoma, N.Y.-based Passport Corp.'s Passport, an enterprise 4GL that marries object and relational database technologies. The decision paid off. Passport was easily learned and quickly employed by existing Cobol staff. The application is operationally efficient and easily modified to meet changing business needs.

The three basic reasons classic OOP will fail are the following:

- The prerequisite training, which requires a new mind-set, is too extensive and complicated.
- Classic OOP theory is fatally flawed for applications that use relational database technology.
- OOP languages and methodology can't accommodate the ever-changing requirements of business and IS.

Classic OOP isn't the wave of the future for enterprise IS. Let's focus our attention instead on improving productivity and making each advance one that makes life easier — not more complicated. Enterprise 4GLs are a much safer bet with a much higher payback. ■

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WEEK 10 OF 19

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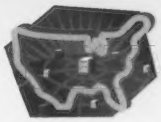

See related story: Buyer's Guide on client/server development tools, 90

Leaders of the Pack

The right packaged software skills can put you at the forefront of the client/server scramble

BY LESLIE GOFF

Do "real programmers" use Visual Basic? You bet! Experience with off-the-shelf, or packaged, client/server software will continue to differentiate IS professionals for at least the next three to five years, managers and recruiters predict.

Companies as diverse as Baxter Healthcare Corp., J. B. Hunt Transport, Inc., Marine Optical, Inc. and Steelcase, Inc. are hiring full-time information systems staff and contractors for core systems development projects. These companies are looking for candidates who understand general client/server concepts and connectivity issues. And they are also screening resumes for key packaged software skills.

HOT AND COLD SOFTWARE SKILLS

IS managers report the following demand for packaged client/server skills

DEMAND LEVEL	LANGUAGE SKILLS	DEVELOPMENT TOOLS	OPERATING SYSTEMS
HOTTEST (high demand/niche market)	• Smalltalk	• Gupta SQL Windows	• Solaris
HOT (high demand/mainstream market)	• C++ • C	• PowerBuilder • Oracle Developer 2000 • Visual Basic	• Windows NT Workstation • HP-UX • AIX • MVS
WARM (medium demand/niche or mainstream market)	• Objective C • MicroFocus Cobol	• JYACC JAM • Uniface	• OS/2 • Windows
COOL (low demand/mainstream market)			• DEC VMS • DOS
COLD (low demand/niche market)		• NextStep • Dynasty • Forte	• OSF/1 • Apple System 7.5

Source: Computerworld's 1996 "Skills Survey"

"The more strategic development is happening in client/server — that's where all the new investment is," says Steve Van Kuiken, director of new product development and SAP project director in the information technology division of Baxter Healthcare in Deerfield, Ill. Van Kuiken says his own career has been fueled by his work on client/server development projects.

"These skills allow you to be very entrepreneurial. You can work for consulting firms, outsourcers, Internet-related start-ups — they're all hiring client/server people. They may not be Fortune 100 companies, but there's a lot of opportunity outside that scope."
— Kathy Brittan White, CIO, Baxter Healthcare

"I think a lot of hardcore developers view packaged installations as a bad thing because they think you don't get a chance to do real development work," Van Kuiken says. "But no one package fills all of a company's needs, so you always need some custom development. There are still opportunities to build your development skills in packaged installation projects, so it's good to have those packages on your resume."

Front-end development tools such as Microsoft Corp.'s Visual Basic and Visual C++, Borland International, Inc.'s Delphi and Powersoft Corp.'s PowerBuilder are still attention grabbers on a resume. But the well-publicized demand for expertise in integrated enterprisewide client/server packages, such as SAP AG's R/3, Oracle Corp.'s Oracle Financials and PeopleSoft, Inc.'s financials family is stealing much of the thunder. And database developers experienced in products from Oracle, Sybase, Inc. and Informix Software, Inc. also remain in high demand, as do those with skills in Computer Associates International, Inc.'s CA-Ingres and related products such as Microsoft's SQL Server.

Other hiring factors include a company's ongoing projects, the competition for talent and the ability to draw candidates to sometimes remote, lesser known areas of the country.

Lowell, Ark.-based trucking company J. B. Hunt, for example, is nestled in the Ozarks in the state's northwest region. The company sometimes has trouble attracting skilled client/server professionals, despite its advanced technology development projects and big-name corporate neighbors such as Tyson Foods and Wal-Mart Stores, Inc. As the company seeks to increase its 140-member IS staff by 15% this year to accommodate critical transportation logistics projects, IS managers say they will look for transferable skills more than specific experience.

Kay Palmer, vice president of applications, and Tracy Black, director of applications development, say they will require a minimum of two years' experience in IS, including at least one project that involves relational database programming and connectivity. Anything else will be nice to have, they say.

At eyeglasses distributor Marine Optical in South Easton, Mass., the need is for a few good Microsoft Access professionals. Responsibilities will involve writing end-user applications that pull data from back-end databases, which are developed in Progress, a SQL-based fourth-generation language.

Search under way

MIS manager Anne Marie Fallon says Marine Optical is under pressure to find staff for global electronic data interchange applications, Internet projects and other customer-oriented systems development.

"We're seeing more development demand," Fallon says. "Many of our retail customers, like Pearle Vision and Wal-Mart, already have sophisticated retail systems in place, and they expect a lot from their vendors. So as we bring in more retail customers asking for more technology-based services, we have to be able to respond."

Office furniture maker Steelcase in Grand Rapids, Mich., and Baxter Healthcare are both in the throes of R/3 implementations. J. B. Hunt will choose a client/server-based financial package this year. But even at these companies, IS managers say they're looking for a certain attitude over credentials.

"Participation on specific projects isn't nearly as important as attitude," says Diane Schwartz, manager of financial systems at Marine Optical. "The open-minded, flexible analyst moves a lot further in this environment than their less open-minded peers."

Possessing such skills also provides greater opportunities for self-employment, says Kathy Brittan White, CIO at Baxter Healthcare.

"These skills allow you to be very entrepreneurial. You can work for consulting firms, outsourcers, Internet-related start-ups — they're all hiring client/server people," Brittan White says.

"They may not be Fortune 100 companies, but there's a lot of opportunity outside that scope." ■

Goff is a freelance writer in New York.

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Mapping Out Career Paths for PROGRAMMERS

His own fast-paced career gives author Gene Wang insights for others

BY ALAN R. EARLS

IF you want to figure out how to better manage your career, land on your feet when your company downsizes or ride the next big trend, there aren't many resources out there.

According to Gene Wang, a former executive vice president of applications and development tools at Symantec Corp., there haven't been any books targeted at the career-planning needs of computer professionals. About the only choice has been the one-size-fits-all *What Color is Your Parachute?*, now in its gazillionth printing.

With that information gap in mind, Wang set out to develop a resource for at least one segment of the industry. The result: *The Programmer's Job Handbook: The Skills You Need for Long-Term Job Security and Programming Success* (Osborne/McGraw-Hill, 1996).

Wang says he has tested a lot of the book's career advice himself and had positive results. "I had a lifelong ambition to be a CEO by age 40," says Wang, 38. Recently, he became president and CEO of Computer Motion, Inc.

"My first point is fairly obvious, but very few people do it: Have a plan for your professional development. It is like New Year's resolutions but focused just on your job."

— Gene Wang, president and CEO of Computer Motion

Wang says the experiences he accumulated from his start in the field — as a programmer at Wang Laboratories, Inc. (no relation) — provided grist for writing the book.

"I saw their demise from the inside," Wang says. "I started out working on a whole operating system by myself, but by the time I left, I had a whole department, and we worked on practically nothing."

Wang then was involved in an artificial intelligence start-up called Gold Hill, Inc. in Cambridge, Mass., which went "from zero to $5 million" in a brief period of time before "hitting the wall."

"I had learned that it was important to understand the big picture, so I got out of Gold Hill before the end," Wang says.

Learning curve

After a productive career move to Borland International, Inc., where he led the development of C++, Wang moved to Symantec to work for Gordon Eubanks, "the best boss I ever had," he says. Unfortunately, the move led to a lawsuit by Borland, which claimed he had taken trade secrets. "It was a very messy thing, but I learned to be more careful when exiting a company," Wang says.

Capsulizing those lessons and many others in a manuscript took Wang about nine months. "The publisher approached me and asked me to write the book, and I agreed to do so because I wanted to help programmers find better careers," he says.

"In the book, my first point is fairly obvious, but very few people do it: Have a plan for your professional development," Wang says. "It is like New Year's resolutions but focused just on your job."

Wang also identifies the seven most crucial skills for successful programmers. "Some are so obvious they are almost insulting — like not putting bugs in your programs. I learned that from my manager at Borland, and it really is true. The programmers that rise to the top are very methodical and make sure they don't have bugs in their code," Wang explains.

Learn to adapt

Wang says it's also important to develop skills in growth areas and to embrace change when it comes along. "I know lots of great people who are pigeonholed maintaining some sort of mainframe accounting package," he says.

Of course, getting the opportunity to work on the right kind of technology also is a matter of finding the right company in which to work. To that end, Wang says the best part of the book is the Dilbert Index — a rough guide to predict how good a company will be to work for.

"I asked Scott Adams [creator of the *Dilbert* cartoon series] how to figure out if you are at a good company," Wang says. Adams, in turn, proposed a general index.

If you go into a company and you see lots of *Dilbert* cartoons taped on the walls, you are in big trouble, Wang says: It's a company that is "too screwed up to be embarrassed by its flaws."

On the other hand, if you go to a company that has no *Dilbert* cartoons adorning the walls, "it is probably somewhat screwed up because it has no humor and can't acknowledge its flaws," Wang says.

The key, Adams told Wang, is to find a company with just the right number of *Dilbert* cartoons decorating its walls.

Wang's book includes some *Dilbert* cartoons, and Wang said he hopes they help motivate readers to manage their careers. He also says he believes the book offers valuable role models of successful programmers and what they do right, insights about key technology trends and solid information about compensation practices.

"Whether I have succeeded or not will be determined by reader feedback," Wang says. ■

Earls is a freelance writer in Franklin, Mass.

Book review: Guidebook to the perfect programmer

Gene Wang offers an invaluable look at the keys of a successful programming career

The Programmer's Job Handbook: The Skills You Need for Long-Term Job Security and Programming Success
By Gene Wang
Osborne/McGraw-Hill, Berkeley, Calif.; 260 pages; $24.95

In keeping with the format of its other computer titles, Osborne has a "skill level" box on the cover of *The Programmer's Job Handbook*. It says simply, "For every programmer." Indeed, every programmer and person with a career linked to computer technology should peruse this well-organized, highly useful handbook.

As the title implies, Wang covers the basics, including defining different job titles and career paths. He also offers advice about effective resume writing and provides a helpful mini-directory of promising software companies in which to work.

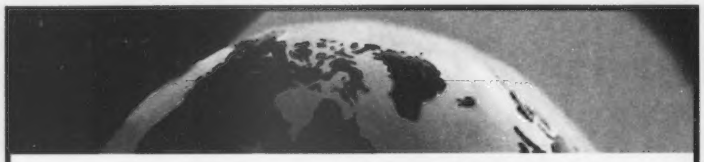
More importantly, Wang serves up many suggestions about achieving success as a programmer and managing projects and software life cycles.

He also includes lots of tips and resources for using the Internet and the World Wide Web to help you find a job.

At the heart of Wang's book are his "seven skills of successful programmers." These include being sure to underpromise and overdeliver, not putting bugs in programs, being passionate and hardworking, "knowing what you don't know," being a team player and following through. His seventh critical skill, keeping up with emerging technologies, is fundamental, he says.

Where you do what you do and in what environment you do it is perhaps most crucial to career success. Wang reviews and analyzes most of the major platforms, operating systems and languages and offers his view of their likely longevity and potential as career boosters. He also repeatedly stresses the need for programmers to focus on the big picture so they can better discern future trends that may affect their careers.

— Alan R. Earls



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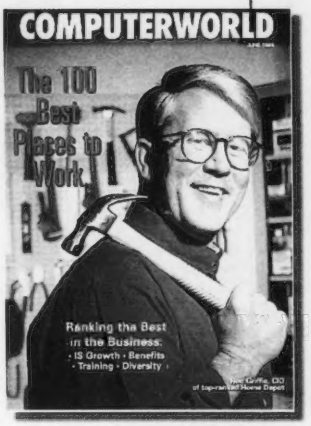

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PROGRAMMER/ANALYST/Level I: (2 positions) 40 hrs/wk. 8 a.m. - 5 p.m., $36,000/yr. Carry out analysis of program specifications, program design, coding and testing of software application systems for manufacturing applications on UNIX environment utilizing C and X-Windows. Reqr. Bachelor's degree in Computer Science or Electrical or Mechanical Engineering. Employer is a s/w development/consulting firm. Relocation to various client sites throughout the U.S. for periods of 6 mos. to 2 yrs. required "Employer paid ad." E.O.E. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref. No: 36606.

PROGRAMMER/ ANALYST

FT. MYERS, FLORIDA

Financial Systems, structured analysis, HP MPE/iX, and TurboIMAGE experience required. (Speedware V6/7, RPG, any 4GL exp. a plus.) Mail resume and salary requirements to: Lee County Clerk of Courts, IS Director, PO Box 9384, Ft Myers, FL 33902. Or fax to 941-335-2440.

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Consultant, 40hrs/wk., 9am - 5pm, $45,646/yr. Design, develop, implement & test software applications for management information systems in a client/server environment. Development of Graphical User Interface (GUI). Database tuning. Data communications & networks. Tools: X/Motif; Windows; C; SQL; Informix; TCP/IP; UNIX; RPC. M.S. in Computer Science as well as one year experience in job offered or as Product Support Programmer required. Previous experience must include: GUI; X/Motif; Windows; C/UNIX; SQL; Informix. Graduate education must include one course on Computer Networks. Submit resume to: Job Service of Florida, 2312 Gulf-to-Bay Blvd., P.O. Box C, Clearwater, FL 34618-4090, RE: Job order #FL-1393125.

SOFTWARE ENGINEER required. Design & develop applications using C/C++ programming, Object Oriented Analysis/ Design, UNIX system internals & Shell Programming. Develop Graphical User Interfaces using Xt Intrinsics, X-View & Xlib. Develop Database Management System using C, C++ & experience with algorithm development & Assembly language coding. Masters Degree or its equivalent required in a Computer Intensive Curriculum, plus 6 months experience in the job duties described above. University work experiences (other than mere classroom study) may be used to satisfy the experience requirements. Must have proof of legal authority to work in the U.S. Salary - $40,000/year for a 40 hour work week. Apply at the Texas Employment Commission, Fort Worth, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778, J.O. #TX7505269. Ad Paid by An Equal Opportunity Employer.

Systems Analyst needed for computer consulting firm located in Tampa, Florida. Job duties include analysis, design, development and implementation of computer software applications. write shell scripts and add functionalities to software programs; use distributed systems and remote procedure calls; use make files to compile C programs; and, involved in PERL programming, parallel programming and analysis of algorithms. Will use C, C++, Embedded SQL, TCP/IP, X-Windows/Motif (GUI), Informix 4GL and UNIX. Applicant must have a M.S. degree in Computer Science or a B.S degree and 2 yrs. exp. with graduate coursework or exp. covering the areas of C, C++, UNIX, Embedded SQL, TCP/IP, and X-Windows/Motif (GUI). 8:00 am -5:00 pm, Mon-Fri, $37,440/yr. Applicant must have legal authority to work permanently in the United States. Submit 2 resumes and cover letter (no calls) to: The Job Service of Florida, 2312 Gulf-To-Bay Blvd., P.O. Box C, Clearwater, FL 34618-4090. Job Order #FL1390044. AN EMPLOYER PAID AD

SYSTEMS ANALYST/PROGRAMMER - Design, develop, & implement software using UNISYS A-Series mainframe computers & related software such as DMSII, COBOL, WFL & LINCII Fourth Generation computer language in the area of health & life insurance. Customize, enhance, implement the total insurance processing solution (TIPS) product written in LINCII on UNISYS A-Series mainframe computer. Develop programming standards, test procedures & conduct staff training. Salary, $65,000 per year, 40 hour week (8:00 - 5:00). Requirements, Master's degree or equivalent in Engineering; 6 months experience in related occupation as a Systems Analyst; experience must include the customization, enhancement and implementation of TIPS software on UNISYS A-Series mainframe using LINC II. Apply at the Texas Employment Commission, Fort Worth, Texas or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778, J.O.# TX7503941. Ad paid by an equal opportunity employer.

SOFTWARE ENGINEER. (2 positions) 40 hrs/wk, 8 a.m. - 5 p.m., $48,000/yr. Carry out the system analysis, system design, coding and testing of computer application systems on IBM PC utilizing SQL Server, Visual Basic and OS/2. Reqr. Bachelor's degree in Computer Science or Electrical or Mechanical Engineering. Reqr. 2 yrs. expr. in job offered, or 2 yrs. expr. in Systems Analysis &/or Programming &/or Software Engineering &/or Computer Consulting. Reqr. work expr. in dev. of s/w systems IBM PC with SQL Server, Visual Basic and OS/2. Employer is a computer s/w development/consulting firm. Relocation to client sites throughout the U.S. for periods of 6 mos. to 2 yrs. required. "Employer paid ad." E.O.E. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref No: 36596.

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- Windows 95
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- NetBios
- OS/2
- SNA

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MARKETING
Job Ref. #IBMRAZ171

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- CTI and/or voice/data integration
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- Marketing Representative

PROGRAMMING
Job Ref. #IBMRAZ172

If you have any combination of the following skills:
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- ESSBASE
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- UNIX
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- TCP/IP
- REXX
- Oracle
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- RISC Assembler
- C
- Internotes
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Please forward your resume, indicating position of interest, and appropriate **Job Ref. #** on resume and all correspondence, to: **IBM Staffing Services, D/1DPA, B/051, P.O. Box 12195, Research Triangle Park, NC 27709, FAX: 1-800-262-2494; e-mail: jobs@vnet.ibm.com.** Visit our website at **http://www.empl.ibm.com/carus.htm** for additional opportunities at IBM. IBM is committed to creating a diverse environment and proud to be an equal opportunity employer.

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BUSINESS ANALYSTS
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You will be working on the conversion from custom in-house developed systems (PRIME) to SAP R/3 software. You will contribute to the development of system functionality outside SAP R/3. Prior implementation and systems development experience is required. ABAP/4 programming experience, is preferred.

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Drawing on your previous experience in systems programming and administration, you will provide Systems Administration, Database and UNIX Technical Support. Background in HPUX, Oracle and Open Systems is a must. SAP R/2 or R/3 Basis experience is an advantage.

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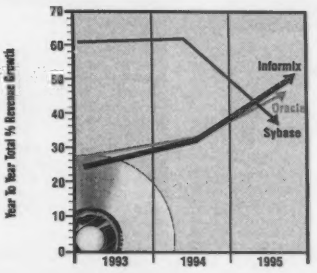

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Multiple openings exist for a Systems/Analyst for a software consulting firm. Duties include: Analysis, Design, Software Development and support of credit analysis and loan processing systems. Design and development of Graphic user Interface Screens and reports for the customer service module. Unit testing, defect fixing and maintenance of programs. Performance tuning of the system. Provide customers with time/cost estimate for any enhancements or change requests. Updating of skills and applications using object oriented tools and techniques on OS/2, UNIX, SQL Server using PM and IBM C/C++ Tools Library, Microfocus Cobol. Requires a Bachelors Degree in Computer Science or Electronics and Communications. Requires two years experience in the job offercd or two years experience as a System/Programmer Analyst to include experience in OS/2, C/C++, SQL Server, and UNIX using object oriented technology, Microfocus Cobol. Salary is $42,940.00 per year. Hours are 8:00 am to 5:00 pm, forty per week. Send resume to 7310 Woodward, Room 415, Detroit, MI 48202. Ref. #20596. Employer paid ad.

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Software Consultant. 40 hr/wk from 9am to 5pm. Salary at $45,000/yr. Job duties to include analysis, design and development of software using Visual Basic 3.0 as front end tool and Sybase and/or SQL Server at the back end. Require Bachelor of Science Degree with Computer Science or Engineering as major and 1 year experience in job offered or 1 year experience as Software consultant/programmer. Experience in job offered or related occupation must include one year using Visual Basic 3.0 as front end tool and Sybase and/or SQL Server at the back end. Must have proof of legal authority to work permanently in the U.S. Please send resumes to Illinois Department of Employment Security, 401 South State Street-3 South, Chicago, Illinois 60605, Attention: Leonard Boksa; Reference #V-IL 14269-B. An Employer Paid Ad. No Calls. Send 2 copies of both resume and cover letter.

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ASSOCIATE SOFTWARE ENGINEER: Will design, develop, and test computer software systems, applying Expert Advisor and Application Software Expert systems, in windows environment utilizing C++ and RDBMS. Will evaluate client requests for custom programming to determine feasibility, cost and time required, compatibility with customer systems and computer capabilities. Requires B.S. in Computer Science; 2 Years Training in applied computer technology; education, training or experience must include object oriented analysis emphasizing windows programming using Borland C++ and RDBMS, evidenced by a research paper, report or project completed in this field; applicant must also have developed and be able to provide a copy of a computer database system based on RDBMS architecture utilizing Oracle. Annual Salary of $29,000. 40 hours/week (8:00 a.m. - 5:00 p.m.) Send resume with Social Security Number to: Indiana Department of Workforce Development, 10 N. Senate Avenue, Indianapolis, Indiana 46204-2277; Attention: Gene R. Replogle, Reference #3379646.

Programmer/Analyst. 40 hr/wk from 9am to 5pm. Salary at $45,000/yr. Job duties to include business analysis, design, development, coding, implementation, unit testing, documentation and user training for manufacturing systems. Require 2 year experience in job offered. Two years experience in the job offered, which must include work with UNIX, Windows, Sybase, SQL Server, T/SQL, APT, DWB, Open Client, DB-Library, C and COBOL. Must have proof of legal authority to work permanently in the U.S. Please send resumes to Illinois Department of Employment Security, 401 South State Street-3 South, Chicago, Illinois 60605, Attention: Leonard Boksa; Reference #V-IL 14616-B. An Employer Paid Ad. No Calls. Send 2 copies of both resume and cover letter.

Programmer Analyst to design and develop program specifications to create detail flow charts and write "C", C++ programs based on Microsoft Windows for networking personal computer systems; develop test plans, data and routines; analyze and design database modules; test program for validity; prepare programs and systems documentation; participate in technical problem solving. B.S. in Computer Science plus 2 years experience as Programmer Analyst or in Software Design. Requires demonstrated ability to program in "C" and C++ language and use database tools. $32,004/yr. 40 hrs/wk. Send resume to: Nebraska Job Service, 550 South 16th Street, P.O. Box 94600, Lincoln, NE 68509. Refer to Job Order No: NE 0155981.

Sr. Programmer Analyst. Plans develops, designs, analyzes, & tests computer programs applying knowledge of programming techniques & computer systems. Trains users on new systems, develops software applications. Required: Bachelor's degree in Science Two yrs., exp. in job offered. Proficiency in the following: Computer languages: Visual BASIC, MS-Access, Visual C++, C++, Business Basic, Pascal, Fortan, COBOL, COBOL II, BASIC, Assembly Languages (Assembler on IBM, Vax-11). Hardware: Minicomputers (Qantel, MAI Basic Four, Sun Workstation, Data General, VAX), IBM PC/Compatibles. Operating Systems: Windows 3.11, Windows NT, MS-DOS, UNIX, BOSS/VX, RDOS, AOS/VS. Databases: MS Access, FoxPro, dbase IV Software: Platinum CICS. 40 hrs/wk. Overtime 4-8hrs/wk. 8:00am-5:00pm. $45K/yr. OT: $32.45/hr. Two copies of resume to: M. Brooks, JETS-ALC PO BOX 7972: Madison, WI 53707-7972: Reference case: #960148

CONSULTANT (Systems Analyst). Design & develop custom manufacturing & distribution systems according to clients' functional res. using employer's CASE products, rel. database s/w & 4 GL app. dev. tools. Analyze clients' Business Info. Flow reqs. using CASE, formulate enterprise models, & design & develop custom applications. Software modules to be implemented include MRP, WIP, BOM/ENG, CRP & Inventory. Must have MS in IE, Mech. Eng or Mfg. Eng., & coursework (3 sem. or quarter hours) in production systems, job costing, & cmptr.-aided mfg. Must have prior bckgrnd. (coursework or project exp.) in rel databases, networks, Unix, C & 4GLs (including forms & reports). $3500/mo. 3 openings. Job/interview: Chicago. Resume to CW-170353, Computerworld, Box 9171, Framingham, MA 01701-9171.

Software Engineer; Job requires M.A. or M.S. in Computer Science and three (3) months experience in the job offered. Must have completed graduate level courses as follows: 2 in Database Management and 1 each in: Distributed Systems, Software Environments and Advanced Software Development. Job duties include: Design, develop and maintain voice response and recognition applications in a telephony environment using VP-Adapl, C, DOS, and UNIX Explore adaptive techniques for dealing with problems of recognition such as speaker differences, environmental characteristics and contextual differences. Will also develop and support paradox for windows multiusers applications and develop client/server communications using TCP/IP and UDP/IP protocols. 40 hrs/wk.; 8am to 5pm.: $40,741.00/yr. Qualified applicants should send resumes to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. No. 28996. Employer Paid Ad.

Systems Analyst. 40 hr/wk from 9am to 5pm. Salary at $45,000/yr. Job duties to include plan, develop, test, and document computer programs on IBM mid range computers. Evaluate user requests for new or modified programs. Consult with users to identify current procedures. Apply knowledge and experience with business and manufacturing systems to implement appropriate system for each client. Train end users. Require Bachelor Degree with Comp. Sci. or Physics as major and 1 year experience in job offered or 1 year experience as Software Consultant. One year experience in job offered or as computer consultant must include one year work on AS400 and RPG 400 and 3 months experience using SYNON. Must have proof of legal authority to work permanently in the U.S. Please send resumes to Illinois Department of Employment Security, 401 South State Street-3 South, Chicago, Illinois 60605, Attention: Leila Jackson, Reference #V-IL 14151-J. An Employer Paid Ad. No calls. Send 2 copies of both resume and cover letter.

Computer Graphics Artist: Create computer graphic animation and video special effects for television productions using Silicon Graphics Alias and Liberty software supported by UNIX, MS-DOS, and OS/2; support on-line video editing. Position requires bachelor's degree in Telecommunications. In completing education, must have gained experience in computer graphic animation and special effects for television productions using UNIX and MS-DOS software tools; must have completed two courses in video productions and one course in copyright law and regulations; and must have knowledge of on-line video editing. 40 hrs/wk; 9am-5pm: salary of $32,700.00/yr. Send resume with Social Security No. to Indiana Dept. of Workforce Development, 10 N. Senate Ave., Indianapolis IN 46204-2277. Attn: Gene R. Replogle. Include ID#3379650 with response. Applicants must be eligible for permanent employment in the United States.

Systems Engineer, 40hrs/wk, 8-5, $42,000/yr. Systems analysis, system design, coding & testing of software for warehouse operations including receiving, shipping, & inventory management. Implement systems using INFORMIX/4GL & C. Code & test using UNIX Shell scripts. Analyze user requirements & design &/or modify RDBMS. Manage database. User support & troubleshooting. Min reqs: BS in Computer Science, 1 yr 6 mos in carrying out those duties set forth in the job offered or 1 yr 6 mos in relational database design, & INFORMIX/4GL, C, & UNIX Shell programming. Apply at the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778, J.O. #TX7505273. Ad Paid by an Equal Opportunity Employer.

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Programmer Analyst (2 openings) to consult with clients to ascertain & define their business requirements or problem areas & utilize technical expertise to provide solutions to client needs; analyze, design & develop computer software for clients EDP systems; analyze, design & develop integrated Autopay Business Information System including process flow & data flow design, data modeling technical support & overall design of application system, meeting with users to gather requirements, develop software, test plan, unit test, system test & technical support for Autopay Business Information System using IBM 3090, IBM ES9000 hardware, MVS/ESA, VM/XA, DB2, SQL, QMF, REXX, JCL, TSO/ISPF, INTERTEST, CS & COBOL II; Reqs. Bach. in Electrical, Electronic or Computer Engg., Management or its foreign equiv. in ed. & exp., 2 yrs. exp in job offered or 2 yrs related-ed exp such as Systems Analyst, Programmer, Software Engineer, Consultant, Programmer Analyst or EDP Analyst. Will accept 3 yrs. college ed. plus 3 yrs exp in job offered or related occup. in lieu of req'd ed. & exp. Related exp must include EDP, system designing, programming, user coordination, COBOL & Novel LAN environ, $46,200/yr.; 40 hrs/wk 8a-5p. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #39096 "Employer Paid Ad"

Programmer Analyst. 40 hrs/wk. 8:00 am - 4:30 pm. $32,000/yr. Duties: Design and code integrated payroll & personnel systems using COBOL programming language to implement system enhancement. Analyze & evaluate accounting systems users' requirements, using knowledge of information system analysis & design, financial accounting & tax transaction. Handle calls at night and on weekends to maintain and support production processing of financial system in a data communication/computer networks environment. Run certain jobs after hours and on weekends for special updates and payrolls. Bachelor's degree in Computer Science required. One year of experience as a programmer analyst or auditor. Candidates must submit a transcript showing completion of at least 16 courses in Computer Science. Among them, one course each must be in COBOL, Advanced COBOL, Information Systems Analysis/Design, Basic Communication System, and Computer Networks. Accounting courses such as, Financial Accounting, Tax/Individual & Property Transaction are also required. The 1 year experience must include experience in an accounting or auditing environment. Must have proof of legal authority to work permanently in the U.S. Job site and interview Chicago, IL. Send two copies of your resume w/covering letter to: Illinois Dept. of Employment Security, 401 S. State Street - 3 South, Chicago, IL 60605. Attn: Dennis Jones. Reference #V-IL 14694-D. - NO CALLS. An employer paid ad.

Database Designer/Engineer for research, analysis & design of Material Handling Module, make data models, process flow & database table design; develop application in Oracle 7.1 RDBMS & front end application in SQL*Forms V3.0/V4.0; write database procedures & database Triggers using Oracle RDBMS 7.1 & PL/SQL 2.0 using Parallel Query Processing; write batch programs using Pro*C & PL/SQL; make reports for system using Oracle Reports 2.0/2.5; perform & tune application using inbuilt utilities of Oracle (Such as TKPROF, EXPLANPLAN); convert existing system COSMIC (Computerized On-Line System for Material & Inventory Control) in IBM 3090 to Oracle on Sequent Machine using SQL*Loader; development of system in Unix/X-Windows environment; Reqs. Master's in Comp. Sci., Computer-Based Info. Systems or equiv. + 2 yrs exp in job offered or 2 yrs related exp such as Sr. Programmer, System Analyst, Programmer Analyst or Grad. Assist. Related exp must include design, development & implementation of database systems, writing specifications, coding & testing of programs & using SQL*Forms V3.0/V4.0, SQL*Plus, SQL* ReportWriter, Pro*C, Oracle, Unix & IBM. Must have courses in: Database Mgmt. Systems, Systems Analysis & Design, Software Engg. Mgmt., & project or coursework in programming with Visual Basic & PowerBuilder: $50,500/yr, 40 hrs/wk 7:30a-4p. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #30896 "Employer Paid Ad"

PROGRAMMER ANALYST (2 openings) (Ref: 202-96) - Plan, develop, test & document comp. programs, applying knowledge of programming techniques & comp. systems; evaluate user request for new or modified programs; determine feasibility, cost & time required compatibility with current sys. & comp. capabilities; consult with user to identify current operating procedures & clarify program objectives; formulate plan outlining steps required to develop program using structured analysis & design; convert project specifications, using flowcharts & diagrams into sequence of detailed instructions & logical steps for coding into language processable by comp. Systems testing, quality assurance, technical support & interacting with users & gathering requirements for sys. enhancements, working on GUI under IBM 3090, using POWERBUILDER, VISUAL BASIC 3.0, SQL Server, Windows Communication Library, DB2, MS Access 2.0, Transaction-SQL & MS Windows 3.1. Reqs. Bach. in Comp. Sci., Systems Analysis, Computer Information Systems, Computer Engineering, Electrical Engineering, Electronic Engineering, Mathematics or its equal. in ed & exp. & 2 yrs. exp. in job offered or 2 yrs. related exp. as a Programmer, Programmer Analyst, System Analyst, Software Engineer, Consultant or Computer Programmer. Will accept 3 yrs. of college ed. plus 3 yrs. exp. in the job offered or in a related occup. in lieu of the req'd ed. & exp. Must have some related exp. which included using POWERBUILDER, VISUAL BASIC 3.0, SQL Server, Transaction-SQL & MS Windows 3.1. $43,000/yr. 40 hrs/wk., 8:30a-5p. Send resume to: 7310 Woodward Ave, Rm 415, Detroit, MI 48202 & include Ref #. Employer Paid Ad.

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PROGRAMMER/ANALYST - Design & develop user interface process using Uniface front-end & Sybase SQL Server/back-end under OSF/Motif/UNIX on an HP Workstation. Design & development of tempiate driven interface to allow external systems to communicate with host On-line system using TCP/IP, INFORMIX ESQL/C & C/UNIX on HP 9000/845 machine. Develop processor to allow upstream systems to unload recent updates on the on-line system in ASCII format. Design and develop FORMS to handle list arrays, multiple screens & windows to display real-time information of record on on-line system using INFORMIX (4GL). Bachelor's in Computer Science & 2 years of experience as programmer/analyst which should include 1 year of experience with INFORMIX (SQL, ESQL/C), TCP/IP, UNIX (System V) & MS-DOS, SYBASE (SQL Server) as back-end & UNIFACE as front-end, OSF/MOTIF, & C/UNIX to design/develop user interface process in user-server environment. 40 hrs/wk. 9-5, $40,000/yr. Apply at the Texas Employment Commission, Houston, Texas or send resume to 1117 Trinity, Room 424T, Austin, TX 78701. JO #TX7505149. Ad paid by an Equal Opportunity Employer.

Environmental Analyst to design, analyze, generate, test & maintain reports of CRIS (Compliance with Regulations Information System); create Emission Certification & Corporate Average Fuel Economy (CAFE) documents along with Fuel Economy Labels for submission to the Environmental Protection Agency (EPA), Department of Transportation (DOT), California Air Resources Board (CARB) and Transport Canada (TC); study Environmental Regulatory Manuals for Report Formats & Specifications; design & generate reports in compliance with regulations of the EPA, DOT, CARB & TC & submit test results to EPA & Vehicle Fuel Economy & Emissions System (VFEES); Reqs. Bach in Comp. Sci. Computer, Civil or Environmental Engg. Or its equiv, 6 mos exp in job offered or 6 mos. related exp such as Programmer or Programmer Analyst. Related exp must include using ORACLE, PRO*C, SQL*Reportwriter, SQL* Forms, SQL*Plus, PL/SQL, UNIX & must have univ. level courses or 3 mos. exp in: Environmental Engg. Operations & Process, & Concepts of Comp. Sci., $24/hr, 40 hrs/wk 8a-5p. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref #38996 "Employer Paid Ad"

Data Base Design Analyst responsible for analyzing complex system requirements to develop the entire life cycle of a sophisticated financial database management system; Develop the relational, physical and logical database design using Case tools 6.0 for Client/Server appications, application development using (SQL* Forms 4.5,6, PL/SQL 2.1.3, Pro*C 1.1, SQL *ReportWriter 2.5, Powerbuilder 3.0a, Sybase System 10), testing, coding and debugging applications for sophisticated windows technology developed through the use of graphical user interfaces (GUI), C and C++ programming languages in Unix based Hewlett Packard environment 9000 environment and VMS/VAX operating systems; and act as Team Leader to a project team of Database Design Analysts and Programmer Analysts.; 40 hr. per wk.; 9:00 AM - 5:00 PM; $58,000/yr.; Master of Science in Computer Science; In lieu of one year in the job offered, 1 year in the related occupation of Database Design Analyst, or Software Engineer, as a special requirement, three months documented experience designing and developing relational, physical and logical database– a Client/Server application using Powerbuilder 3.0a and Sybase System 10 in Unix based Hewlett Packard 9000 environment, including design, development and enhancements of a Credit Application Database Management System or financial database management system. All experience may be gained concurrently with employment. Send resumes to 7310 Woodward Avenue, Room 415, Detroit, Michigan 48202, Ref.# 34496. "Employer Paid Ad."

PROGRAMMER ANALYST (2 openings) (Ref: 35096) - plan, develop, test & document comp. programs, applying knowledge of programming techniques & comp. systems; evaluate user request for new or modified programs; determine feasibility, cost & time req'd, compatibility with current sys. & comp. capabilities; consult with user to identify current operating procedures & clarify program objectives; formulate plan outlining steps req'd to develop program using structured analysis & design; convert project specifications, using flowcharts & diagrams into sequence of detailed instructions & logical steps for coding into language processable by comp. The responsibilities include process flow & data flow design, technical support & overall design of applications, meeting with user to gather requirement, coding, testing, quality assurance & using IBM 3090, DB2, MVS/ESA, CICS, INTERTEST, SPUFI, TSO, REXX, VSAM, JCL, PLATINUM TOOLS, MICROFOCUS, WORKBENCH, VS COBOL II, MSWORD, PC/AT, COBOL, C & SYBASE. Reqs. Bach. in Comp. Sci., Systems Analysis, Computer Information Systems, Computer Engineering, Electrical Engineering, Electronic Engineering, Mathematics or its equiv. in ed & exp. & 2 yrs. exp. in job offered or 2 yrs. related exp. as a Programmer, Programmer Analyst, Systems Analyst, Software Engineer or Consultant. Will accept 3 yrs. of college ed. plus 3 yrs. exp. in the job offered or in a related occup. in lieu of req'd ed. & exp. Must have some related exp. which included coding, testing, quality assurance & using each of the following: PC/AT, COBOL, C & Sybase. $45,000/yr. 40 hrs/wk., 8:00a-5p, M-F. Send resume to 7310 Woodward Ave, Rm 415, Detroit, MI 48202 & include Ref #. Employer Paid Ad.

PROGRAMMER ANALYST (Ref. 35796) - plan, develop, test & document comp. programs; apply knowledge of programming techniques & comp. systems; evaluate user request for new or modified program; determine feasibilities, cost & time req'd compatibility with current sys. & comp. capabilities; consult with user to identify current operating procedures & clarify program objectives; formulate plan outlining steps required to develop program using structured analysis & design; convert project specifications using flowcharts & diagrams into sequence of detailed instructions & logical steps for coding into language processable by comp. Analysis, design, creating program specifications, development/customization & maintenance support using Oracle Applications suite of products including Oracle Inventory, Oracle WIP, Oracle BOM, Oracle MRP, Oracle MPS, Oracle General Ledger, Application Object Library; concurrent processing; & using Forms 2.3, PL/SQL, PRO*C, SQL*ReportWriter, SQL*RPT & UNIX Shell Scripting. Reqs. Bach. in Comp. Sci., Systems Analysis, Computer Information Systems, Computer Engineering, Electrical Engineering, Electronic Engineering, Mathematics or its equiv. in ed & exp. & 2 yrs. exp. in job offered or 2 yrs. related exp. as a Programmer, Programmer Analyst, Systems Analyst, Consultant or Software Engineer. Will accept 3 yrs. of college ed. plus 3 yrs. exp. in the job offered or in a related occup. in lieu of the req'd ed. & exp. Must have some related exp. including design, development, maintenance & using each of the following: Oracle Inventory, Oracle WIP, Oracle MRP, Oracle MPS, Oracle General Ledger, Application Object Library & PL/SQL. $60,000/yr. 40 hrs/wk., 8a-5p, M-F. Send resume to 7310 Woodward Ave, Rm 415, Detroit, MI 48202 & include Ref. #. Employer Paid Ad.

Software Engineer: Will design and develop appropriate software and software systems including use of algorithms to create embedded systems and appropriate interface design for use in control systems and other functions for a computerized precision measurement machine which is used to gauge physical measurement of manufactured products to insure quality control and adherence to precise dimension specifications. Will perform appropriate software and modification of software systems to customize scientific and precision measurement system to meet customer requirements. Will use principles of digital signal processing, image processing, and graphics to create appropriate images to allow end users viewing of precision measurement system analysis. Will create color image processing system using compression and transmission systems using C++ including development of a user interface and creation of an interface between the image processor and a microprocessor. Requires Master's degree in Software or Electrical Engineering, or Computer Science. Also requires six months experience in the job to be performed or six months experience as a System Engineer. Education to include completion of one project in which the individual developed a software package for digital image capture, compression and transmission systems using C++ to develop a user interface. Education to include completion of one project in which the individual developed a color image compression system in C language using image processors and creation of interface design between the image processor and the microprocessor. If experience in related field, entire experience must include the development of an information system for display purposes including user interface design. Hours: 9:00 a.m. - 5:00 p.m. 40 hours per week at $38,570.00 per year salary. Must have proof of legal authority to work permanently in the U.S. Please send resume to: Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, Illinois 60605, Attention: Janet Aschenbrenner, Reference #V-IL 14186-A, An Employer Paid Ad. No Calls - Send 2 copies of both resume and cover letter.

Programmer - Analyst/Database Administrator. 40 hr/wk from 9 am to 5 pm. Salary at $45,000/yr. Job duties to include coordinate physical changes to computer data bases; code, test and implement physical data base, using data base management systems. Design logical and physical databases. Installation and performance tuning. Recovery and Space allocation planning. Train and answer questions of end-users. Environment: Oracle 7.0. Require Bachelor of Science Degree with Computer Science or Mathematics as major and 2 year experience in job offered or 2 year experience as Computer Programmer. One year experience doing Database Administration on Oracle 6.0 or Oracle 7.0 and using SQL*DBA, SQL*Forms 3.0 ON Unix based computers. Must have proof of legal authority to work permanently in the U.S. Please send resumes to Illinois Department of Employment Security, 401 South State Street-3 South, Chicago, Illinois 60605. Attention: Ruth Daniels; Reference # V-IL 13899-R. An Employer paid Ad. No calls. Send 2 copies of both resumes and cover letter.

Software Development Consultant. 40 hr/wk from 8am to 5pm. Salary at $4,000/mo. Job duties to include design and develop new modules for sales and marketing system using LANSA case tool on IBM AS/400 COBOL/400 and RPG/400. SQL/400, AS/400 Query/400. Write applications to support company's manufacturing operations, analyze control procedures, correct problems and refine database, develop technical specifications for user support, generate design, coding and testing procedures, provide on site debugging, modification and code optimization. Must have Bachelor of Science Degree with Engineering or Computer Science as major, 1 month training of LANSA and 2 year experience in job offered or as Software Engineer, Systems Analyst, or Software Consultant working on IBM AS/400 using COBOL/400, RPG/400, CL and SQL. Must have proof of legal authority to work permanently in the U.S. Please send resumes to Illinois Department of Employment Security, 401 South State Street-3 South, Chicago, Illinois 60605, Attention: James Gregory; Reference #V-IL 14150-Z. An Employer Paid Ad. No Calls. Send 2 copies of both resume and cover letter.

Network & Support Analyst: perform UNIX system & network administration on multi-platforms such as SUN, SGI, HP and DEC workstations including first level customer support of various application s/w (Ford developed s/w /DGS & third party s/w such as IDEAS, Softwindows, FrameMaker); responsible for network installation of operating sytems & s/w packages, system upgrade & configuration, UNIX shell script programming, troubleshooting & system performance tuning. Req. MS in computer sci; 2yr exp in job offered or related as Sys Adm't related exp include 3mon in network installation of operating sys & s/w (PDGS), 6mon in use of SUN Workstation, 1yr in UNIX shell script programming. 40hr/wk, 8-5pm. $850/wk. Employer paid ad. Send resumes to 7310 Woodward Ave. Rm 415, Detroit, MI 48202. Ref No. 38896.

Analyze user reqs, develop and impiement info. mgmnt. systems using APS, C, XDB and PC CICS on UNIX based hardware. Use PVCS for version control. Enhance/ debug existing systems and programs and test systems. M-F; 40 hrs/wk; $48,000/yr. Req. Bach in Comp. Sci., Elect. Eng. or Math and 18 mos exp. Employer Paid Ad. Send resumes to 7310 Woodward Avenue, Room 415, Detroit, Michigan 48202, Reference No. 306-96.

Manager TRIZ Software R&D Dept. M.S. Engineering or Programming, min. 6 yrs. experience. Develop new methodology and adapt exiting ones to the implementation of type of software supporting solution of engineering and other innovative problems based on the TRIZ. Min. 5 yrs. of experience working with TRIZ. Must read technical Russian. $56,000/yr, 40 hrs/wk, 8-5pm. Employer paid ad. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. No. 19495

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PROGRAMMER/ANALYST - Position in Collierville. Design, develop and implement software systems for human resources and payroll application. Code, test, debug, implement and document systems and procedures utilizing DB2, SQL, VSAM, COBOL, COBOL II, JCL, and MVS/ESA on IBM mainframe and MICROFOCUS COBOL WORKBENCH. Requires one year of experience utilizing DB2, SQL, CICS, VSAM, COBOL, COBOL II, MVS/ESA, TSO, ISPF, JCL and MICROFOCUS COBOL WORKBENCH, as well as 1 year of experience developing software programs for human resources and payroll applications. Requires Master's degree in Engineering or Computer Science and 2 years occupational experience. 40 hrs/wk, 8:00 a.m. to 5:00 p.m. $37,000/yr. Send resume to: Charles Turner, TN Dept. of Emp. Sec., 311 Martin Luther King Blvd., P.O. Box 11088, Chattanooga, TN 37401-2088. Refer to Job Order #TN6200096

PROGRAMMER ANALYST. Performing feasibility studies; EDP requirement analysis; review, evaluate and suggest modifications to client requests; Design input and output layouts; prepare system and program specifications; plans, develops, defines programs and systems; writes detailed operating procedures; database design and system flowcharts; prepare test plans and test data; programming testing and documentation; assist the users in migrating to new application. The above applications will be performed using IBM mainframes and its utilities particularly MVS, DB2, CICS COBOL and IEF, CASE TOOL for analysis, design and development. Requirements: Bachelor's degree in Computer Science, or Math-related and 2 years experience. Must be able to travel. Salary: $46,000/year. Qualified applicants submit resume to: Georgia Department of Labor, Job Order No. 5957700, 465 Big Shanty Road, Marietta, Georgia 30066-3303, or the nearest Department of Labor Field Service Office.

SOFTWARE ENGINEER (Atlanta, GA) to analyze user requirements, prepare functional and technical specifications, and design, develop, implement and maintain realtime on-line transaction and batch processing systems for business and government applications on Unisys 1100/2200 and IBM mainframes using Structured Systems Analysis and Design techniques, CODASYL network DMS 1100, 4GLS, DPS 1100, TIP 1100, EFS, ENDEVOR/ESA, ORACLE, and IQU under OS 1100 and MVS/ESA operating systems. Require: B.S. degree (or equivalent) in Computer Science/Engineering, or a closely related field, with four years of experience in the job offered. Salary: $50,000/year; M-F, 8 a.m. to 5 p.m. Send resume to: Anoop Sinha, Legal Department, Mastech Corp., 1004 McKee Rd., Oakdale PA 15071.

SOFTWARE ENGINEER to design, develop, enhance, maintain and set up client-server financial and inventory systems on multiple UNIX/networked platforms such as HP-UX/PC using software engineering techniques with C, C++, systems programming, TCP/IP programming and Graphical User Interface Motif/XT, PowerBuilder, Oracle database and tools Pro*C, SQL*Forms, SQL*ReportWriter, SQL*Plus and UNIX utilities Awk, Make, SCCS; utilize ERWIN/CASE Tool, neural networks and optimize and administer Oracle. Require: B.S. in Computer or Systems Science and three years experience in the described job duties as Software Engineer or as Systems Analyst. Coursework must include Neural Networks. M.S. and 1 year's experience will be acceptable. Salary, $46,000 per year, 8 am to 5 pm, M-F. Apply by resume to: Job Service of Florida, 2312 Gulf-To-Bay Blvd., P.O. Box C, Clearwater, FL 34618-4090. J.O. # FL-1384714.

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Virtualogic is an IT consulting firm headquartered near Washington, D.C. providing client/server development and support to over 80 commercial clients. We seek quality applicants interested in relocating to Washington. Minimum of four years IT experience, B.S. in CS or equivalent, and excellent interpersonal skills are required. As one of Virtualogic's key consultants, you will earn $90-115K, plus excellent benefits doing UNIX and database consulting for our Fortune 1000 clients. Positions are available in the following:

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Responsibilities include developing/distributing FSS products/services to a growing customer base spanning the U.S.; leading a team of approximately 10 data processing professionals in the development/implementation of software changes necessary to support HCFA mandates or customer requested changes; providing ongoing customer service; and interacting with a variety of external organizations, including other BCBS plans, other Medicare contractors, vendors and suppliers, and the Health Care Financing Administration. Requires a Bachelor's degree and 5-7 years experience in developing EDP systems, including project management accountability or 8-10 years of system experience, with at least 2 of those years in a leadership position. A high degree of planning, coordination, customer focus, excellent written/verbal communication skills, and broad experience in software planning, development/management also required. Medicare knowledge desirable. **Reference #SAD-6296.**

SR. TECHNICAL ANALYST

Responsibilities include leading/developing programming and system changes for the FSS; analyzing/developing/testing on-line and batch programs; coordinating/resolving customer inquiries; and performing quality assurance functions. The selected candidate will play a major role in team communication, synergy, and performance and will provide guidance/leadership in all phases of project development. Requires a Bachelor's degree and 7 years experience with project development (systems analysis, programming, debugging, and testing) or at least 9 years project development experience, and a high level of expertise in methodologies/analytical techniques/technical proficiency such as CICS, COBOL II, TSO/ISPF, VSAM, JCL, etc. Previous leadership experience preferred; Medicare knowledge a plus. **Reference #SAD-6295.**

TECHNICAL ANALYST II

Responsibilities include designing/developing/modifying application system/programs which support the FSS. Requires 5 years of related application design and coding work or at least 7 years of related business experience in application design and coding work, and the ability to interact in a team/customer-oriented environment. Technical knowledge/expertise must include proficiency in ABEND analysis. **Reference #SAD-6297.**

TECHNICAL ANALYST I

Responsible for successful completion of program coding analysis assignments. Requires 3 years of related application design and coding experience. Knowledge/expertise in FOCUS, SAS, or DB2 a definite plus. Reference #SAD-6298.

Both Technical Analyst positions are also responsible for interpreting/developing program specifications/requirements; developing program designs/structure charts, program code, test and production of JCL; and testing/creating all required documentation. Both positions require a Bachelor's degree or comparable training in Data Processing; technical knowledge/expertise with IBM, COBOL, JCL, Panvalet, ISPF, TSO, etc.; knowledge/skill in the design/development of on-line CICS applications including screens, files and programs; technical expertise/problem-solving skills in order to design, develop and analyze a variety of applications programs; and excellent verbal/written communication skills.

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Programmer/Analyst responsible for measuring quality & performance of warehouse distribution center. Specifically, will assist in root-cause analysis to determine performance variations. Will analyze, design, construct, maintain, debug & provide support to real-time warehouse management system. System interfaces with conveyor systems, local PC networks & radio frequency terminals; system controls distribution planning, pick processing, shipping, manifest, statistical performance data gathering, decision support. Will analyze statistical data to produce performance reports. Requirements: B.Sc. in Statistics, C.I.S. or Computer Science and Two (2) years experience in Job Offered OR two (2) yrs. exper. in any occupation developing ORACLE OLTP systems in UNIX environment. Candidate's experience must include a period of expertise in ORACLE program development using Pro*C, SQL* Forms & SQL*Report, and Explain Plan utility; expertise in logical data modelling using entity relationship & data flow diagramming techniques; expertise creating physical ORACLE database & expertise using source code management tools. TWO OPENINGS. Salary: $50,000/yr: M-F 9:00-5:00. Job Location: Memphis, TN. Send resumes to: Case Numbers TN6200124 & TN6202123, attn: Charles Turner, Tennessee Department of Employment Security, 311 Martin Luther King Blvd., P.O. Box 11088, Chattanooga, TN 37401-2088. EOE. Applicants must be U.S. workers eligible to accept employment in the United States on a full-time basis.

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The Harris Electronic Systems Sector is creating the future with emerging software products and systems for many exciting applications. Right now, we are seeking qualified individuals for immediate opportunities at our headquarters facility in **Melbourne, FL.** Candidates for the following positions must possess a Bachelor's degree and at least 1-10 years of experience in one or more of the areas listed:

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- **Commercial Applications**—Melbourne and international positions available in Transit, Energy Management Systems, Airports, Transportation Surveillance. Experience with C, C++, UNIX, MOTIF, X-Windows, WindowsNT, client/server or communication protocols required.
- **Business Applications**—Lead SW development in migration to PeopleSoft Financials. Requires experience with COBOL, SQL, Logical Data Modeling techniques, Process Characterization, SW development life cycle, and client/server architecture. Financial applications and PeopleSoft a plus.
- **Database Development**—SW development experience with mainframe database applications, DB2, COBOL, MVS, or IEF CASE Tools required.
- **Scientific Applications (SW design/development)**—Requires experience in C++, Ada, OO Methods, UNIX, CASE Tools, Rationale and HW interfaces, Real-time SW, GUI, Command and Control SW, networking, HTML, image processing, VxWorks, RDBMS, or X/MOTIF GUI. A security clearance with SBI, TS or "X" access is a plus.

Management Information Systems

- **Voice/Data Networks**—LAN/WAN experience required. SONET, FDDI, Ethernet and transmission systems experience preferred. Security clearance a plus.
- **Network Operations Management**—Requires experience with bridge/ routers, network hubs, Ethernet, operating systems, protocols, desktop computing, troubleshooting network infrastructures. EBI security clearance a plus.

Systems Engineers

- **Voice/Data Networks**—Requires LAN/WAN, digital transmission, routers, bridges, Ethernet and TCP/IP experience. SONET, ATM, ISDN, SS7 experience preferred. Security clearance a plus.
- **Commercial Applications**—Melbourne and international positions in Transit, Energy Management Systems, Airports, Transportation Surveillance. Telecommunications, SATCOM or client/server experience required.

Engineering Specialist

Requires AS degree (or equivalent), PC/Mac HW/SW troubleshooting, MS DOS, MS Windows (1.3, 3.11, NT), MS Office Suite, TCP/IP, FDDI/ Ethernet network protocols, UNIX, Microsoft NT LAN administration experience.

Apply Today! (Reference Dept. CW/0325) Fax: (407) 729-1858 (fine mode); Email: resumix@harris.com (ASCII text); Mail: Harris ESS, Human Resources, P.O. Box 37, MS 2/1430, Melbourne, FL 32902; Web: http://www.ess.harris.com/; JobLine: (407) 727-5020. EOE M/F/D/V.

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SOFTWARE ENGINEER: Proven ability in using ORACLE CASE* Designer to produce Entity Relationship Diagrams (ERD), Data Flow Diagrams (DFD) and Functional Hierarchy diagrams; Demonstrated ability in using ORACLE CASE* Dictionary and ORACLE CASE* Generator for reports and forms; Proven ability in using the ORACLE tool set SQL *Forms, ORACLE *Forms, SQL *ReportWriter, ORACLE* Reports and SQL* Plus; Demonstrated ability in developing procedures, functions and database triggers using PL/SQL for server end processing. Duties: Interviewing the end users to identify functional requirements, Data modeling based on the functional analysis, Populating ORACLE CASE REPOSITORY, Producing Entity Relationship and Functional Hierarchy diagrams, Generating user interface screens (SQL *Forms), menus (SQL *Menu) and reports (ORACLE* Reports). Coding the common business functions as database packages, procedures and functions using PL/SQL. Creation of database objects. Requires Masters in Computer Science with 3 yrs and 6 mths. exp. in Software Development. 40 hrs/week at $50,000/yr. Please send resume to Case #51418, PO Box #8968, Boston, MA 02114.

PC SOFTWARE ENGINEERS

This leader in state-of-the-art scanning and data systems seeks PC software Engineers, with BS/MS in CS/EE, to join their existing team:

PC SOFTWARE DEVELOPMENT—Diverse role in the development/support of TSRs, DLLs and embedded firmware within PC architectures. 8+ years general experience, including embedded and real-time programming, BIOS, hardware components, DOS TSR development in Assembly, with TCP/IP, FTP, DLLs and network firmware/protocol stack development desired. Power management and serial communications are strong pluses.

PC SYSTEMS SOFTWARE DEVELOPMENT—To develop/support Windows DLLs and VBxs for MS Windows—an expert in developing software applications using MS Windows, with Visual Basic, PowerBuilder & Delphi. 4+ years experience including MFC and DLLs. with VxD and VBx/DCx desired. Assembly, network protocol stacks and DOS TSR development are strong pluses.

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SYSTEMS ANALYST: Analyze, design, develop and test software applications. Technical environment: UNIX, C, ORACLE, SQL*Forms 3.0, Reportwriter 2.0, PL/SQL and related client-server and distributed and windowing technologies. Duties: user interaction, requirements definition, project planning, design program specification, coding, unit integration and testing. Education & Experience: B.A. or B.S. degree with a concentration in Computer Science and two years as Programmer/ Systems Analyst/Software Engineer to include experience or graduate coursework in Oracle 6.0, SQL*Forms 3.0, PL/SQL, RPT & UNIC/C. Salary: $42,000/ yr. Benefits: major medical for self, vacation, and sick leave. This is a consulting position and extensive travel within the US is required. Applicants having proof of legal authority to work in US respond to Georgia Department of Labor, Job Order # GA 5947245, 2943 N. Druid Hills Rd., Atlanta, GA 30329-3909, or the nearest Department of Labor Field Service Office.

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- BS in Computer Science preferred

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This MIS position is located at our Woonsocket, RI home office and is responsible for UNIX systems administration for a HP server and workstation environment.

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Programmer/Analyst: Develop software/programming for on-line customer info system & for on-line service order handling system. Upgrade, simplify, enhance hardware performance. Recommend application software, work w/ clients to develop custom software pkgs. Test/install programs assuring user friendliness. Debug/make changes after programs are installed. Use C language & Perl scripts to dev. Client-Server/network applications over TCP/IP and NetBIOS Networking transports involving Sun SPARCStations, Windows NT servers, Windows NT Workstations and Windows for Workgroup workstations. Dev., implement Performance tuning activities to keep network/Windows NT server performance at peak service rates. Req.: 4 yrs exp in position or 4 yrs in position(s) in software/program testing/development. $52,000/yr, 40 hrs/wk, 8:30am-5:30pm. Submit resume to: Job Service of Florida, 2660 W. Oakland Park Blvd., Ft. Lauderdale, FL 33311-1347. Re: Job Order # - FL 1397983.

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SYSTEMS ANALYST to analyze, design, develop, test and implement client/server applications for commercial and healthcare information systems using IE (Information Engineering) methodology and object oriented programming tools such as TI's IEF Case Tool, OS/2, Unix, C, C++ and Oracle 7.0 RDBMS; design GUI (Graphical User Interface) with PowerBuilder/Visual Basic; responsible for project development and tracking responsibilities utilizing Yourdon methodology, Excelerator, PERT, CPM and SDM/70. Require: B.S. in Computer Science and two years experience. Experience must include one year of TI's IEF CASE tool, C, UNIX and OS/2. Salary: $45,000 per year, 8 am to 5 pm, M-F. Apply by resume to: Dept. of Labor/Bureau of Operations, 1320 Executive Center Drive, Atkins Room 244, Tallahassee, FL 32399-0667. Job Order Number FL-1396030.

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DB Developers must have 4+ years in OO software engineering.
DB Administrators must be experienced in production level UNIX System or database administration, with experience writing UNIX Shell scripts.

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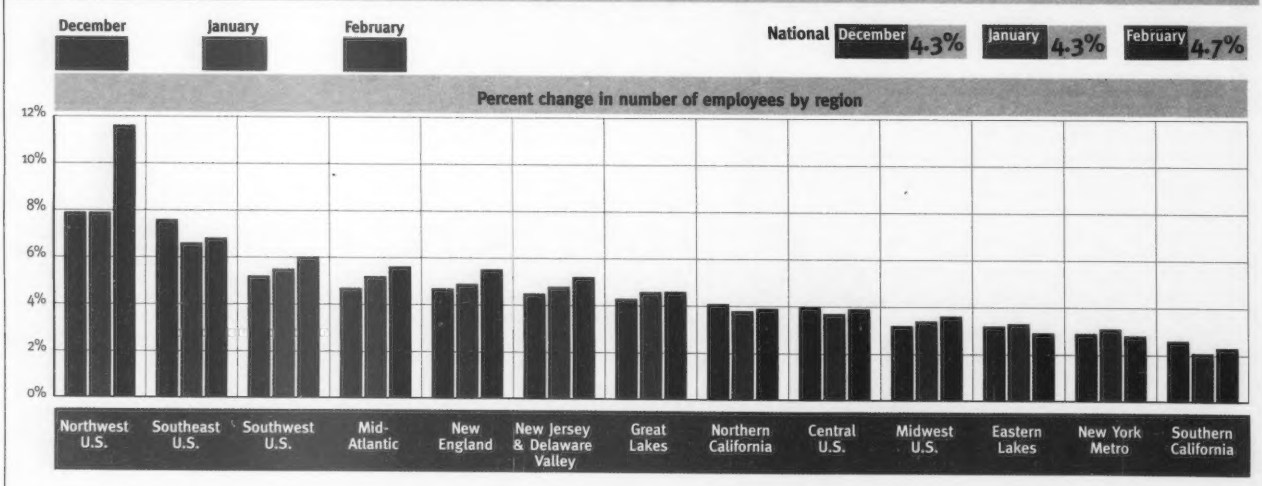

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Marketplace

Doing the power lunch

CIOs must deal with client/server application vendors that skirt them to reach the CEO

By Leslie Goff

It's beginning to look a lot like the '70s: You can catch your favorite episode of *Welcome Back Kotter* on Nick-at-Nite, buy a polyester shirt and bell-bottom jeans at the mall and spy a software salesperson courting your CEO over an expensive meal.

When it comes to choosing client/server-based financial applications, the decision is frequently being made outside the information services department.

"It seems that the CEO goes out to lunch with an SAP exec, has three martinis, and it's a done deal," says Jim Webber, head of Omicron, a consortium of East Coast-based information systems executives in Mountain Lakes, N.J. "These decisions are being made at the top, without a lot of the disciplined cost/benefit analysis."

One analyst disagrees. "I think it's two martinis. But the SAP decision certainly seems to emanate from the top," says Barry Wilderman, vice president of application development strategies service at Meta Group, Inc. in Stamford, Conn.

IS managers and analysts alike agree that SAP America, Inc. in Wayne, N.J., has marketed its software to the executive suite so effectively that, quite often, neither IS nor the lines of business are in on the decision.

"I get calls all the time from CIOs who say, 'Don't tell me whether I should have bought it or not; I had nothing to do with it. But now that I have it, how do I implement it?'" says Bobby Cameron, a senior analyst at Forrester Research, Inc. in Cambridge, Mass.

SAP's R/3, the leading enterprisewide financials package, is a "take-it-or-leave-it" purchase: You buy the whole suite of integrated applications — from general ledger to accounts payable — or none at all. Building on its integration strengths, SAP captured the imagination of senior management to the tune of $1.88 billion last year, Cameron says. Its closest competitor is Oracle Corp., with sales of $700 million.

"There is only one company, vendor or otherwise, that has ever built a fully integrated, enterprisewide client/server application, and that's SAP," Cameron notes. "That was the fantastic dream of the last 15 years. SAP has delivered against that belief and has caught our fancy. Very conservative, centrally controlled applications make senior executives feel more comfortable."

Yet, SAP is winning over IS management. It has done so by fulfilling key functionality and technical requirements, such as the ability to handle high transaction volumes and do ad hoc reporting.

Baxter Healthcare Corp. in Deerfield, Ill., had a list of more than 500 requirements for its re-engineering of legacy financial systems to a client/server environment, says Steve Van Kuiken, director of new product development and SAP project director. His team screened some 50 packages.

"SAP stood apart because of its breadth of functionality. Far and away, it met more of our requirements. It probably isn't as fully functional as our legacy app," he says, "but because of the integration, we'll have less reconciliation of the numbers, and we'll be able to close our books a lot faster."

The deal maker will be transaction volume for J. B. Hunt Transport, Inc. in Lowell, Ark., which is gearing up to buy a client/server financial package.

"We produce 650 checks a night, and each check could have multiple invoices," explains Kay Palmer, vice president of applications at the company. Overall features and the vendor's financial stability and reputation for service and support will also be important.

"Integration of the systems is important, but more from a user standpoint," she says. "We need accounts receivable, accounts payable and general ledger to interface, and we need to be able to build our own interfaces between some systems." ■

Goff is a freelance writer in New York.

PREPARATION CHECKLIST

- ✖ Before you throw out your legacy system, make sure it isn't getting the job done. Don't confuse poor access to data with poor systems. You may be able to accomplish your goals by installing middleware between front-end applications and back-end databases.
- ✖ Determine whether you need an enterprisewide application or a "best-of-breed" financials-only package.
- ✖ Decide whether the application will roll out across the entire company at once or unit by unit.
- ✖ Look for integration with other applications: Is the package fully integrated or does it offer interfaces between applications?
- ✖ Analyze the vendor's financial performance, R&D strategies and long-term commitment to the product.
- ✖ Narrow your choice to two vendors before you begin product testing and evaluations.
- ✖ Devise a checklist for technical criteria (i.e., Is it fully integrated? Does it offer on-line analytical processing? How strong is the data replication?).
- ✖ Devise a checklist for functional criteria (i.e., Does your company keep multiple books in multiple languages for multiple currencies? Do you need configurable ledgers? Is activity-based costing important? Can the package generate scheduled invoices? Will users be able to do ad hoc reports?).

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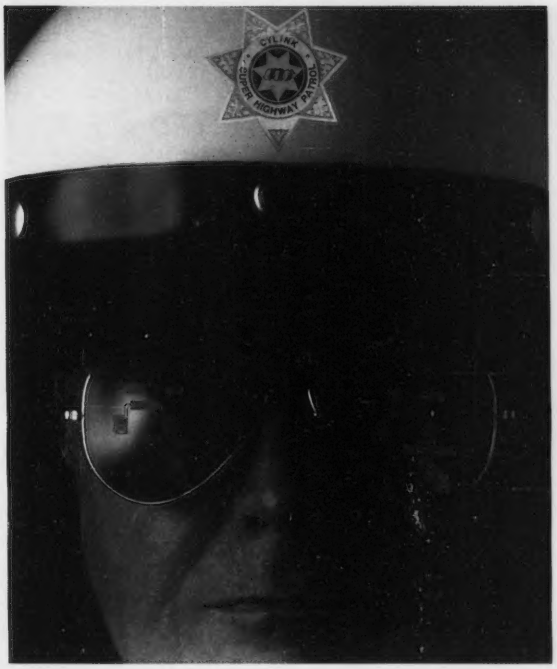

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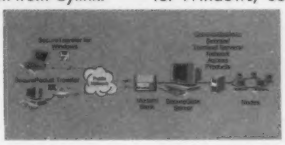

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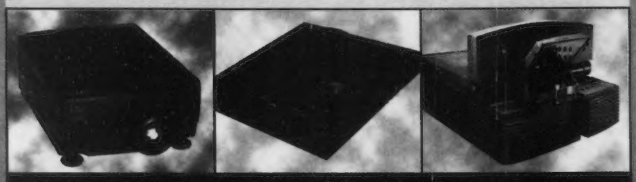

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STEVE MEEK

'net assets

By Tam Harbert

Finding good investment information on-line presents the perennial challenge of the Internet.

"It's out there somewhere. The question is where," says Jim Jubak, senior financial editor of *Worth* magazine and author of *The Worth Guide to Electronic Investing*.

There are hundreds of investment sites on the Internet and the various on-line services. For those interested in technology stocks, the problem is finding a way to sift out nontechnology-related information.

For example, there is a plethora of information on technology stocks in the Usenet newsgroups, such as misc.invest, Jubak says. Recently, one newsgroup contained a series of exchanges among investors and an engineer at Silicon Graphics, Inc. (SGI). That kind of information can provide valuable insight into a company.

"There was a wealth of technical detail there that I haven't seen in any analyst's reports that cover the company," Jubak says.

To help him locate only technology-related information, Jubak uses a "newsbot" program that works with his Internet service. The program can be set up to automatically log in to various newsgroups and scan for key words, delivering only relevant newsgroup postings.

Jubak also recommends that investors check the World Wide Web pages of the top high-technology investment bankers, including Hambrecht & Quist, Inc., Robertson, Stephens & Co. and Alex. Brown & Sons, Inc. These sites typically include reports from analysts and details on upcoming conferences. Knowing when an investment house is having a high-profile conference can be key information for an investor because technology stocks often rise or fall in reaction to news from a conference, Jubak says.

And don't neglect the home pages of the companies in which you've invested. About 1200 public companies have home pages on the Web, 900 of which include investor information, according to Carol Abrahamson, president of Investor Relations Resources, a consulting firm in Mountain View, Calif.

Abrahamson regularly scours the Internet for general investment sites and for company home pages that contain investor relations information. Her consultancy publishes a quarterly newsletter for the investor relations departments of public companies.

The amount and quality of investor information on company home pages ranges from basic, such as a few press releases on earnings reports, to comprehensive. Among the companies with the most comprehensive information is AT&T, Abrahamson says.

The company includes not only its annual report and quarterly updates, but also its fact book, a companion document to the annual report that contains extensive details, such as executive biographies and lists of key customers. "These are the things that Wall Street needs to follow a company," she notes. Companies typically print only a few thousand copies of their fact book and distribute it to Wall Street and institutional investors.

AT&T's site also includes a transcript of the chairman's annual meeting speech and a summary of the annual meeting votes.

In general, telecommunications companies have good investor information on their home pages.

"In terms of investor vision, the telcos seem to be using technology to the limits," Abrahamson says. In contrast, computer companies such as SGI and Sun Microsystems, Inc. are lightweight. "The investor content of their sites clearly isn't a priority," she notes.

Tips for researching on-line:

■ **PRIORITIZE.** Make a list of no more than 10 kinds of information you would like to access on-line, such as news headlines, quotes, analysts' recommendations, earnings estimates or Federal Reserve Board monetary policy. This list should reflect your investment style and goals, so be as specific as you can. For example, if you use technical analysis — looking at a stock's price and volume data from the past to predict future price movements — then historical price and volume data should be high on your list. But if you invest based on basic data, then earnings might be your first priority.

■ **EVALUATE.** Just as important as the quality and quantity of information is the structure of the site. Even a site with great information can overwhelm you unless it provides tools to separate the useful from the useless.

■ **KEEP EXPLORING.** Remember that building an on-line investment system is always a work in progress because new resources are constantly coming on-line. Information that everyone knows is less valuable than information that is lesser known and can provide a temporary edge.

(Excerpted from *The Worth Guide to Electronic Investing*, Harper Collins, $16.)

The Week in Stocks

Gainers

PERCENT

Radius Inc.	117.6
Emulex Corp.	34.6
Micrel Semiconductor Inc.	30.7
Egghead Discount Software	26.5
Iomega Corp.(H)	22.4
IPL Systems Inc.	17.9
Business Objects(H)	17.7
Racotek Inc.	16.2

DOLLAR

Business Objects(H)	13.13
Shiva Corp.(H)	7.75
Cascade Communications(H)	4.75
Cambridge Tech. Partners	4.75
Computer Horizons(H)	4.63
Ascend Communications(H)	4.38
Iomega Corp.(H)	4.38
Micrel Semiconductor Inc.	3.88

Losers

PERCENT

Network Computing Devices	24.1
Quarterdeck Corp.	18.2
AST Research Inc.	17.4
Digital Equipment Corp.	15.6
Manugistics Group Inc.	13.8
Ross Systems	13.8
Softkey International Inc.	13.0
Informix Corp.	11.1

DOLLAR

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Security Dynamics Tech.	6.25
Seagate Technology	4.88
US Robotics(H)	4.50
Informix Corp.	3.75
IBM	3.38
Applix Inc.	3.25
BMC Software Inc.(H)	3.25

Industry Almanac

Netcom or 'netgo'?

As **AT&T Corp. (NYSE:T)** and **MCI Communications Corp. (NASDAQ:MCIC)** enter the Internet access market, the stock of the early darlings of Internet access have fallen. How will one of the pioneers, **Netcom On-Line Communications Services (NASDAQ:NETC)**, fare?

Rakesh Sood, a technology analyst at Hambrecht & Quist, Inc. in San Francisco, has a hold on the stock. The price of Internet access has dropped to near zero with the entrance of AT&T and MCI, both of which offer five hours of free Internet access to their telephone subscribers.

To balance usage, Netcom needs more business subscribers. But the company recently reported that the proportion of its revenue derived from corporations has dropped from 18% to 16%, Sood says. To increase corporate business, Netcom must beef up the extent and speed of its network, he says.

"The combination of higher expenditures and lower margins has pushed out profitability from the beginning of 1997 to the middle of 1998," Sood says.

But Charles Finnie, an analyst at Volpe, Welty and Co. in San Francisco, rates the stock a strong buy.

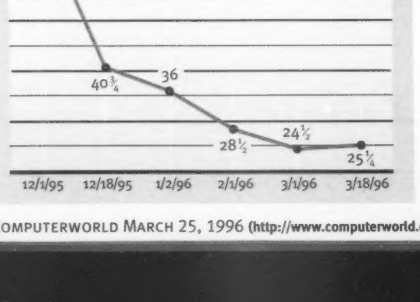
"The fear, uncertainty and doubt surrounding the new AT&T service has caused a market overreaction, sending Netcom's price lower than it should be," he says. Finnie says AT&T seems unprepared to service Internet customers.

And Netcom is a potential takeover target for larger companies that are entering the Internet access market, he notes.

— Tam Harbert and Stewart Deck

Netcom's woes

Analysts say Netcom's recent stock price plunge makes it ripe for a takeover



Exch	52-Week High	52-Week Low		Mar. 22 3 PM	Wk Net Change	Wk Pct Change
Communications and Network Services						UP 2.36%
COMS	53.63	25.75	3 COM Corp.	41.50	-2.63	-5.9
AIT	66.88	40.88	AMERITECH Corp.	57.38	2.88	5.3
AXE	22.13	16.63	Anixter Intl.	18.75	0.75	4.2
APTS	15.00	2.75	Apertus Tech.	4.00	-0.25	-5.9
T	68.88	47.88	AT & T	61.25	0.00	0.0
ASND	58.25	7.50	Ascend Communications (H)	54.00	4.38	8.8
BNYN	18.63	6.00	Banyan Systems Inc.	7.69	-0.31	-3.9
BAY	50.00	21.75	Bay Networks Inc.	34.00	-1.50	-4.2
BBN	48.75	16.50	BBN Corp.	28.63	-1.00	-3.4
BEL	80.38	51.50	Bell Atlantic Corp.	64.38	2.38	3.8
BLS	45.88	29.13	Bellsouth Corp.	38.88	2.25	6.1
BRKT	37.25	9.13	Brooktrout Technology (H)	31.50	-2.75	-8.0
CS	87.75	42.63	Cabletron Systems	69.88	0.38	0.5
CSCC	89.50	20.38	Cascade Communications (H)	85.75	4.75	5.9
CGRM	25.13	12.75	Centigram Communications	21.50	0.50	2.4
CSCO	51.00	16.75	Cisco Systems Inc.	45.38	-1.38	-2.9
CLIX	11.38	5.50	Compression Labs Inc. (L)	5.81	-0.56	-8.8
CMNT	12.75	4.00	Computer Network Tech.	5.13	-0.38	-6.8
XCOM	14.50	8.75	CrossComm	10.00	-0.25	-2.4
DIGI	64.00	21.88	DSC Communications	28.13	-0.81	-2.8
FORE	75.00	25.50	FORE Systems Inc. (H)	72.94	3.69	5.3
GDC	21.88	9.25	General Datacomm Inds.	10.88	0.00	0.0
GSX	42.50	28.00	General Signal Networks	36.75	-0.13	-0.3
GTE	49.25	31.88	GTE Corp.	44.13	2.38	5.7
MCIC	31.00	19.09	MCI Communications Corp.	30.19	2.19	7.8
MICM	12.50	5.50	MICOM Communications Corp.	9.25	-0.38	-3.9
MNPI	34.50	9.13	Microcom Inc. (H)	33.13	1.13	3.5
NETM	34.00	10.00	NetManage Inc.	11.13	-0.38	-3.3
NTRX	8.75	3.63	Netrix Corp.	4.88	-0.13	-2.5
NCDI	12.00	3.94	Network Computing Devices	3.94	-1.25	-24.1
NWK	42.00	19.75	Network Equipment Tech.	29.75	3.00	11.2
NETG	46.50	22.75	Network General	41.75	-1.75	-4.0
NN	53.25	25.00	Newbridge Networks Corp.	49.38	1.25	2.6
NT	50.88	31.50	Northern Telecom Ltd.	49.75	1.00	2.1
NOVL	23.25	11.38	Novell Inc.	13.13	0.81	6.6
NYN	59.25	39.25	Nynex Corp.	51.25	2.63	5.4
OCTL	48.25	18.00	Octel Communications Corp. (H)	48.25	2.75	6.0
ODSI	43.25	15.75	Optical Data Systems Inc.	23.25	-0.75	-3.1
PCTL	44.72	14.50	Picturetel Corp.	34.75	-0.19	-0.5
PTON	10.75	4.75	Proteon Inc.	5.50	0.25	4.8
RACO	7.88	4.25	Racotek Inc.	5.38	0.75	16.2
RETX	5.50	1.81	Retix	4.00	0.00	0.0
SFA	24.88	11.38	Scientific Atlanta Inc.	18.75	0.50	2.7
SHVA	96.25	28.25	Shiva Corp. (H)	94.00	7.75	8.0
SBC	60.25	41.63	Southwestern Bell Corp.	53.38	2.38	4.7
FON	45.50	28.88	Sprint Corp.	37.38	2.00	5.7
SMSC	23.50	12.50	Standard Microsystems Corp.	16.13	0.25	1.6
STRM	44.50	16.00	Stratacom Inc.	34.00	0.25	0.7
TBIT	8.63	2.38	Telebit Corp.	4.69	0.56	13.6
USRX	139.75	30.88	US Robotics (H)	129.50	-4.50	-3.4
USW	48.38	28.38	US West Inc.	32.75	2.13	6.9
XIRC	15.50	8.88	Xircom	11.13	0.69	6.6
XYLN	60.50	51.75	Xylan Corp. (L)	53.50	-2.25	-4.0
Plus and Week stocks						OFF 0.09%
AALR	9.63	4.25	Advanced Logic Research	7.00	0.00	0.0
AAPL	50.13	25.00	Apple Computer Inc.	25.00	-0.63	-2.4
ASTA	19.13	4.75	AST Research Inc.	4.75	-1.00	-17.4
CPQ	56.75	31.13	Compaq Computer Corp.	37.88	-1.88	-4.7
DELL	49.38	21.25	Dell Computer Corp.	32.75	-0.50	-1.5
GATE	37.50	16.00	Gateway 2000 Inc.	26.50	-1.00	-3.6
HWP	104.13	59.13	Hewlett Packard Co.	97.50	-1.25	-1.3
MUEI	29.88	9.00	Micron International Inc.	10.63	0.38	3.7
NIPNY	75.13	49.50	NEC America	54.63	0.13	0.2
SGI	45.63	21.13	Silicon Graphics	24.75	-0.38	-1.5
SUNW	57.13	16.63	Sun Microsystems Inc.	45.13	-1.63	-3.5
Large Systems						OFF 1.76%
AMH	13.63	6.75	Amdahl Corp.	8.75	-0.50	-5.4
CYR	29.25	17.63	Cray Research Inc.	28.50	-0.13	-0.4
DGN	19.13	6.75	Data General Corp.	15.00	-0.50	-3.2
DEC	76.50	31.50	Digital Equipment Corp.	54.13	-10.00	-15.6
IBM	128.88	81.25	IBM	115.63	-3.38	-2.8
MDCD	13.00	3.00	Meridian Data Inc.	10.25	-0.50	-4.7
NETF	7.75	4.25	NetFrame	4.38	-0.50	-10.3
SQNT	25.38	10.13	Sequent Computer Sys.	12.00	1.63	15.7
SEQS	10.00	3.63	Sequoia Systems Inc.	3.75	0.00	0.0
SRA	36.13	23.00	Stratus Computer Inc.	27.38	-0.13	-0.5
TDM	17.75	8.75	Tandem Computers Inc.	9.13	0.13	1.4
TRCD	5.75	2.00	TriCord Systems	4.56	0.44	10.6
UIS	13.63	5.50	Unisys Corp.	6.00	-0.50	-7.7
Software						OFF 1.48%
ADBE	74.25	30.00	Adobe Systems Inc.	31.38	-3.13	-9.1
AMSWA	8.75	3.50	American Software Inc.	3.88	-0.25	-6.1
APLX	41.75	8.25	Applix Inc.	36.25	-3.25	-8.2
ARSW	48.50	28.75	Arbor Software	43.50	0.63	1.5
ACAD	53.00	27.75	Autodesk Inc.	36.00	-1.25	-3.4
BACH	11.88	4.00	Bachman Info. Systems	10.25	0.88	9.3
BGSS	42.00	27.75	BGS Systems Inc.	35.50	0.00	0.0
BMCS	61.38	27.63	BMC Software Inc. (H)	56.00	-3.25	-5.5
BOOL	26.38	18.25	Boole and Babbage	74.75	1.50	6.5
BORL	21.25	7.75	Borland Int'l Inc.	17.75	-2.19	-11.0
BOBJY	87.25	28.75	Business Objects (H)	87.25	13.13	17.7
CESH	3.94	1.38	CE Software	2.75	-0.25	-8.3
CYE	27.88	12.38	Cheyenne Software Inc.	22.63	0.25	1.1
COGNF	63.25	18.75	Cognos Inc.	56.50	1.25	2.3
CA	76.50	37.00	Computer Associates	70.00	-2.38	-3.3
CVN	15.50	4.63	Computervision Corp.	9.50	-0.63	-6.2
CPWR	37.75	15.50	Compuware Corp.	24.75	-1.06	-4.1
CSRE	27.25	9.88	Comshare Inc.	23.50	1.25	5.6
COSFF	19.50	8.38	Corel Corp.	10.25	0.00	0.0
DWTI	16.25	5.75	Dataware Technologies Inc. (L)	6.25	-0.25	-3.8
DSLGF	32.25	9.75	Discreet Logic Inc.	14.75	0.00	0.0
FILE	67.00	30.25	Filenet Corp.	59.88	-1.63	-2.6
DDDDF	8.25	3.38	4th Dimension	5.88	-0.06	-1.1
FTPS	40.63	10.38	FTP Software Inc.	12.38	-1.38	-10.0
GSOF	26.00	7.50	Group I Software	9.00	0.50	5.9
GPTA	11.63	4.88	Gupta	5.88	0.00	0.0
HOGN	13.88	5.50	Hogan Systems Inc.	12.13	-0.06	-0.5
HYSW	28.38	14.00	Hyperion Software Corp.	22.50	2.00	9.8
IRIC	18.63	10.00	Information Resources	14.38	-0.13	-0.9
IFMX	36.75	16.63	Informix Corp.	30.13	-3.75	-11.1
INGR	20.13	10.00	Intergraph Corp.	17.75	1.00	6.0
LEAF	12.63	4.25	Interleaf Inc.	9.25	0.31	3.5
ISLI	26.25	8.75	Intersolv Inc.	11.13	-0.63	-5.3
INTU	89.25	29.63	Intuit Inc.	48.50	-3.00	-5.8
LGWX	19.50	10.88	Logic Works	16.13	-1.63	-9.2
MGICF	13.75	3.63	Magic Software Enterprises	10.88	-1.13	-9.4
MANU	20.50	9.50	Manugistics Group Inc.	12.88	-2.06	-13.8
MAPS	40.00	10.00	MapInfo Corp.	12.00	-0.63	-5.0
MATH	7.38	2.75	MathSoft	6.38	-0.13	-1.9
MCAF	65.25	16.13	McAfee Associates (H)	57.75	-2.00	-3.3
MENT	22.88	10.88	Mentor Graphics	14.75	-0.13	-0.8
MIFGY	12.88	8.25	Micro Focus	9.50	-0.13	-1.3
MGXI	15.13	5.75	Micrografx Inc.	13.75	-0.75	-5.2
MSFT	109.25	68.75	Microsoft Corp.	101.00	-0.88	-0.9
ORCL	55.00	28.00	Oracle Corp.	48.38	-0.38	-0.8
PMTC	38.25	17.88	Parametric Technology	36.50	-0.38	-1.0
PARQ	17.50	6.63	ParcPlace Systems Inc.	8.38	0.50	6.3
PSFT	59.25	19.63	Peoplesoft (H)	55.50	1.00	1.8
PTEC	16.13	6.75	Phoenix Technologies	12.88	0.00	0.0
PSQL	16.88	1.13	Platinum Software	7.13	0.13	1.8
PLAT	26.00	11.25	Platinum Technology	15.75	1.50	10.5
PRGS	38.00	19.50	Progress Software Corp.	21.13	-0.38	-1.7
RNBO	26.75	15.13	Rainbow Technologies Inc.	18.38	-1.38	-7.0
ROSS	7.75	2.19	Ross Systems	3.13	-0.50	-13.8
SCOC	15.00	5.50	SCO Inc.	6.50	0.25	4.0
SDTI	67.50	12.00	Security Dynamics Tech.	53.00	-6.25	-10.5
SKEY	51.75	13.38	Softkey International Inc.	18.00	-2.69	-13.0
SPCO	5.13	2.19	Software Publishing Corp.	3.06	-0.38	-10.9
SQAX	27.75	16.00	SQA Inc.	27.38	2.13	8.4
SOTA	14.88	6.63	State of the Art	12.63	-0.75	-5.6
SSW	72.63	32.88	Sterling Software Inc.	69.50	-0.13	-0.2
SDRC	35.50	8.38	Struct. Dynamics Research (H)	33.69	0.38	1.1
SYBS	45.25	19.88	Sybase Inc.	24.88	-1.63	-6.1
SYMC	33.25	9.88	Symantec Corp.	13.38	0.88	7.0
SNPS	38.50	23.00	SynOpsys	30.00	-1.25	-4.0
SSAX	30.63	12.63	System Software Assoc.	22.25	1.75	8.5
SYSF	18.13	7.75	Systemsoft Corp.	16.38	0.25	1.6
TRUV	10.13	3.88	Truevision Corp.	7.31	0.31	4.5
VIEW	15.13	8.38	ViewLogic Systems	10.75	0.06	0.6
VMRK	21.50	5.75	VMark Software Inc.	7.13	-0.63	-8.1
WALK	11.13	4.63	Walker Interactive Systems	10.19	0.00	0.6
WALL	51.25	13.00	Wall Data Inc.	15.31	0.19	1.2
WANG	25.38	11.13	Wang Laboratories Inc. (H)	25.00	1.13	4.7
Internet						OFF 3.20%
AMER	60.00	16.75	America On-Line	53.88	-0.25	-0.5
NETC	91.50	19.00	Netcom On-Line	25.25	0.13	0.5
NSCP	87.00	22.88	Netscape Comm. Corp.	42.75	1.00	2.4
PSIX	29.00	8.75	PSINet	10.13	-0.38	-3.6
QDEK	39.50	3.50	Quarterdeck Corp.	14.63	-3.25	-18.2
SPYG	61.00	13.25	SpyGlass Inc.	25.00	-1.13	-4.3
UUNT	98.75	21.75	UUNET Tech.	26.25	-1.00	-3.7
Semiconductors						UP 0.44%
AMD	39.25	16.13	Advanced Micro Devices	17.00	-0.63	-3.5
ADI	30.13	16.63	Analog Devices Inc.	27.75	-1.25	-4.3
CHPS	15.88	7.13	Chips and Technologies	9.25	0.88	10.4
CRUS	61.13	16.75	Cirrus Logic	18.00	-0.38	-2.0
CY	27.75	10.00	Cypress Semiconductor Corp.	12.50	0.00	0.0
CYRX	49.75	18.25	Cyrix	23.25	-0.19	-0.8
INTC	78.38	40.13	Intel Corp.	56.25	-2.38	-4.1
LSI	62.50	22.50	LSI Logic Corp.	27.38	-0.88	-3.1
LSCC	43.00	23.00	Lattice Semiconductor	29.38	0.75	2.6
MCRL	32.50	12.50	Micrel Semiconductor Inc.	16.50	3.88	30.7
MU	94.75	27.50	Micron Technology	32.00	0.13	0.4
MOT	82.50	44.75	Motorola Inc.	54.38	-0.63	-1.1
NSM	33.63	14.13	National Semiconductor	14.88	0.00	0.0
SERA	28.75	9.75	Sierra Semiconductor	20.63	-1.88	-8.3
TXN	83.75	42.75	Texas Instruments	50.63	1.13	2.2
VLSI	39.13	10.75	VLSI Technology	12.63	0.13	1.0
WWTK	6.88	1.25	Weitek	1.63	0.00	0.0
WDC	22.13	13.13	Western Digital Corp.	18.13	-0.63	-3.3
XLNX	55.50	20.75	Xilinx	34.25	-2.50	-6.8
ZLG	54.13	28.50	Zilog Inc.	32.88	-0.25	-0.8
Peripherals and Subsystems						UP 5.90%
APCC	25.88	7.88	American Power Conversion	10.00	-0.38	-3.6
ADPT	56.38	29.25	Adaptec Inc.	50.25	-2.88	-5.4
CBEX	13.13	4.25	Cambex Corp.	6.13	0.25	4.3
CGNI	7.25	2.25	Cognitronics Corp.	4.94	-0.25	-4.8
CREAF	14.13	5.88	Creative Technologies Inc.	6.81	0.44	6.0
RACE	13.13	3.63	Data Race Inc.	4.75	0.00	0.0
DTM	9.38	4.13	Dataram Corp.	4.38	-0.06	-1.4
EMC	27.38	13.00	EMC Corp.	20.63	0.00	0.0
EMLX	28.50	6.38	Emulex Corp.	13.13	3.38	34.6
ESCC	25.25	13.00	Evans and Sutherland	21.75	-1.50	-6.5
EXBT	18.00	10.00	Exabyte	15.00	-0.13	-0.8
IISLF	4.25	1.50	Intelligent Info. Systems	2.00	-0.13	-5.9
IOMG	24.88	2.25	Iomega Corp. (H)	23.88	4.38	22.4
IPLSA	7.88	2.50	IPL Systems Inc.	5.75	0.88	17.9
KMAG	37.50	14.75	Komag Inc.	25.50	-1.94	-7.1
MLIS	7.50	1.25	Micropolis Corp.	2.25	0.31	16.1
MTSI	37.75	11.25	Micro Touch Systems Inc.	14.75	-0.50	-3.3
PEAK	34.75	16.75	Peak Technology Group	21.50	-1.00	-4.4
PNCL	19.75	5.88	Pinnacle Micro Inc.	8.00	0.00	0.0
PTNX	38.75	13.50	Printronix Inc.	19.00	1.00	5.6
AQM	6.38	3.25	QMS Inc.	5.25	0.00	0.0
QNTM	28.50	13.75	Quantum Corp.	18.88	-0.19	-1.0
RDUS	14.13	0.94	Radius Inc.	2.31	1.25	117.6
SEG	67.75	25.38	Seagate Technology	53.88	-4.88	-8.3
STK	31.75	17.88	Storage Technology	26.38	-0.38	-1.4
TEK	61.88	29.75	Tektronix Inc.	35.00	1.50	4.5
XRX	144.63	109.38	Xerox Corp.	130.50	-2.13	-1.6
Services						UP 2.94%
AMSY	26.38	11.38	American Mgmt. Systems	26.13	1.50	6.1
ANLY	37.75	21.00	Analysts Int'l	35.50	-0.25	-0.7
AUD	43.38	30.25	Auto Data Processing	39.50	-0.75	-1.9
CATP	61.00	27.25	Cambridge Tech. Partners	53.00	4.75	9.8
CEN	47.50	31.63	Ceridian Corp.	43.13	-2.25	-5.0
CDO	23.75	17.13	Comdisco Inc.	20.50	0.00	0.0
CHRZ	37.13	7.38	Computer Horizons (H)	37.13	4.63	14.2
CSC	80.75	46.50	Computer Sciences	70.88	0.75	1.1
TSK	22.00	10.25	Computer Task Group	20.13	0.88	4.5
CPU	50.13	17.50	CompUSA Inc. (H)	49.88	0.75	1.5
CDAT	26.13	6.50	Control Data Systems Inc. (H)	23.50	-0.25	-1.1
EGGS	14.25	5.00	Egghead Discount Software	7.75	1.63	26.5
GME	58.00	38.38	General Motors E (EDS)	55.50	-1.88	-3.3
INAC	18.50	7.88	Inacom Corp.	17.38	0.25	1.5
INEL	14.63	3.50	Intelligent Electronics	5.50	-0.63	-10.2
KEA	30.88	18.25	Keane Inc.	28.75	-0.13	-0.4
MSEL	8.38	2.25	Merisel	2.94	0.25	9.3
MICA	15.00	7.25	Micrage Inc.	10.38	1.00	10.7
PAYX	62.50	28.75	Paychex	57.00	-2.38	-4.0
PMS	54.25	42.63	Policy Management Sys.	49.88	1.25	2.6
REY	40.88	25.88	Reynolds and Reynolds	39.75	0.00	0.0
SEIC	24.50	17.25	SEI Corp.	23.50	0.75	3.3
SMED	62.88	32.00	Shared Medical Systems	61.25	1.38	2.3
SSPE	26.50	14.88	Software Spectrum Inc.	20.50	0.44	2.2
SNDT	37.00	21.63	Sungard Data Systems (H)	36.50	1.50	4.3

KEY: (H) = New annual high reached in period (L) = New annual low reached in period

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Our **CompuServe** address is 76537,2413 for editorial correspondence only. Direct **subscription** inquiries to CompuServe: 73373,1230.

Respond to our **Talkback** inquiries at talkback@cw.com.

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Second-class postage paid at Framingham, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385607. Computerworld (ISSN 0010-4841) is published weekly; except a single combined issue for the last week in December and the first week in January by Computerworld, Inc., 500 Old Connecticut Path, Box 9171, Framingham, Mass. 01701-9171. Copyright 1996 by Computerworld, Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed. Back issues, if available, may be purchased through the circulation department. Photocopy rights: permission to photocopy for internal or personal use is granted by Computerworld, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970. Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, Computerworld, Inc., 500 Old Connecticut Path, Box 9171, Framingham, Mass. 01701-9171. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $6.00 a copy; U.S. — $48 a year; Canada — $110 a year; Central & So. America — $150 (surface) a year; Europe — $295 a year; all other countries — $295 a year. Subscriptions call toll free (800) 669-1002. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, P.O. Box 2044, Marion, OH 43305.

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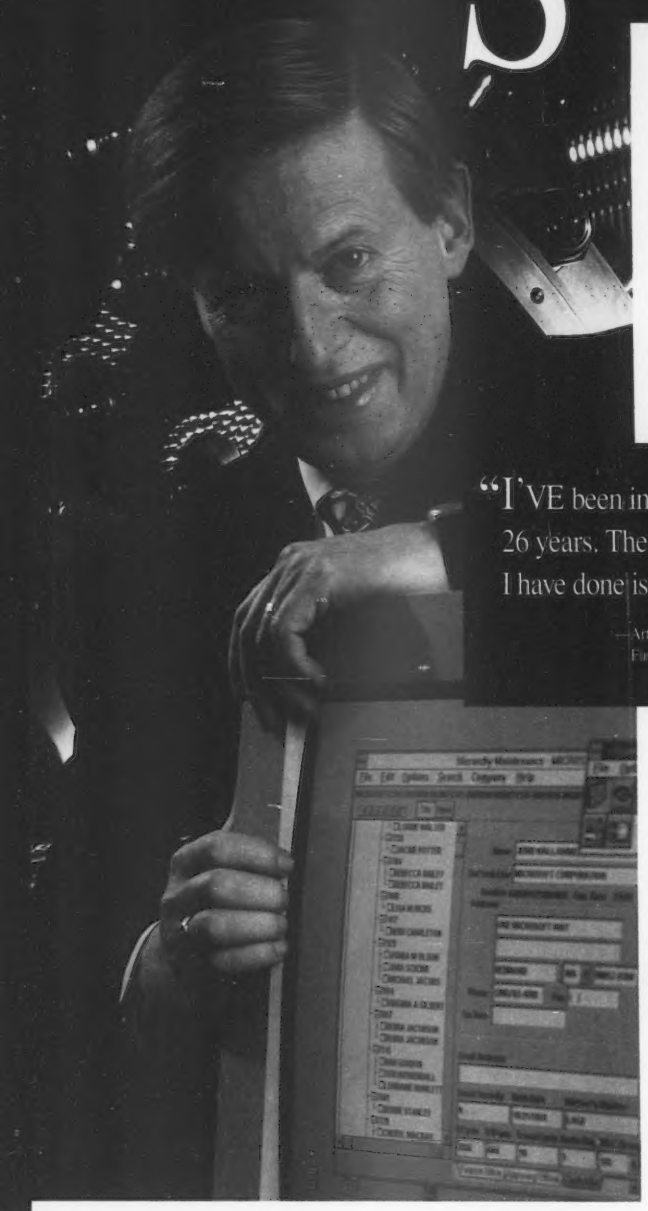

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Airline turbocharges schedule efficiency

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pared with the $1.2 million in shrink-wrapped software that vendors pitched to Southwest — proposals that didn't include system interfaces to the airline's reservations and maintenance systems.

Most airlines already use linear programming technologies to optimize flight and crew schedules, "but there's a lot more that airlines can do with technology to improve upon these processes," said Mark Shields, a principal in the aviation practice at Mercer Management Consulting in Washington. Unlike competitors such as United Airlines, which manages multiple aircraft types across international regions, Southwest flies only Boeing 737s on domestic routes.

Perfect fit

As such, Southwest would likely gain more from automating its flight planning activities than most airlines "since it has a formula that plays on simplicity," Shields added.

The airline is hoping to do just that. Its project, called the Southwest Airlines Integrated Flight Tracking System (Swift), is a set of Unix Motif-based programs that the airlines' 37 dispatchers and routers began using last fall to track 2,200 daily flights. The systems were built using Cambridge, Mass.-based Integrated Computer Solutions, Inc.'s Builder Xcessory tool.

Bon voyage

Southwest has been awarded the U.S. Department of Transportation's "Triple Crown" four years running

Ontime performance *(Percent of total flights that were on time)*

SOUTHWEST	82.3%
NORTHWEST	80.7%
US AIR	79.8%

Customer complaints per every 100,000 passengers

SOUTHWEST	.21
NORTHWEST	.52
ALASKA AIRLINES	.52

Lost luggage per every 1,000 passengers

SOUTHWEST	4.26
CONTINENTAL	4.69
AMERICA WEST	4.82

Source: U.S. Department of Transportation

Dispatchers armed with Silicon Graphics, Inc. Indigo II workstations are now able to click onto Motif buttons to calculate how much fuel is needed for a flight or to route a plane around bad weather, according to Mark Mortland, the lead programmer on the Swift project. Previously, these tasks were performed manually.

Later this year, Southwest will add other applications to Swift to address flight planning, maintenance and other functions, said Marty Gephart, a systems engineer and a Swift project leader for the $2.9 billion carrier.

Chain reaction

To date, Swift has enabled Southwest's dispatchers to reroute passengers from canceled or delayed flights 20 times faster than it could using manual techniques.

For example, if a 2 p.m. arrival into Houston is going to be 20 minutes late, the dispatchers and routers can click on a series of Motif buttons to figure out how that will affect the outgoing 4 p.m. flight and connecting flights for passengers, Gephart explained.

Prior to Swift, dispatchers and routers had used a 17-ft.-long flow sheet that contained all of Southwest's daily flight information. Although they had become proficient at scanning the flow sheet, dispatchers and routers often took up to 15 minutes to check the airline's reservation system and passenger lists before coming up with a set of rerouting options.

"We were missing opportunities to protect the customer because there was so much data to look for" on the flow sheets, said Dave Jordan, director of flight dispatch at Southwest.

But by using their Indigo II workstations, staffers can now get that information in just 15 seconds by accessing a Sybase, Inc. 10.0.2 relational database management system through Hewlett-Packard Co. K400 servers.

That speed is critical to Southwest, which added 300 daily flights last year after expanding its arsenal from 191 planes to 226 aircraft in 1995.

The largest U.S. insurer is also looking to maintain a competitive edge. See page 51.

Scheduler links Unix, NT, host

By Bob Francis

Data center managers who bemoan the dearth of enterprise-wide job scheduling tools will get a new option next month when Platinum Technology, Inc. announces AutoSys 3.3.

AutoSys is a job scheduling product that runs on Unix and Microsoft Corp.'s Windows NT platforms. The new version will include integration with Zeke MVS, a widely used mainframe job scheduler that Platinum also owns.

Later versions will link with other mainframe job schedulers, said Chip McAvoy, vice president of Platinum's AutoSys group in Oakbrook Terrace, Ill.

Jump on it

Integrating job schedulers with mainframe applications gives information systems managers the ability to quickly move jobs completed on one platform to another, explained a beta user of AutoSys 3.3 at a major West Coast telecommunications company.

Currently, system administrators have to set up alerts that indicate when one platform has completed a job so they can send it to another platform. The integration of Zeke MVS and AutoSys allows that to happen automatically, McAvoy said.

Some applications, such as SAP AG's R/3 and Legato Systems, Inc.'s Legato, include their own job schedulers, so future versions of AutoSys will integrate with those as well, McAvoy said.

Other features of AutoSys 3.3 include time zone support and the ability to communicate with other AutoSys environments in other locations.

At Networld/Interop '96 next week, Platinum will announce that three of its product lines have been certified to work with Hewlett-Packard Co.'s OpenView IT/Operations console. That means IS managers can access Platinum's AutoSys, along with its DBVision and ServerVision performance management tools, from HP's operations console.

Platinum is projecting revenue of $300 million this year and now has more than 2,000 employees worldwide.

Platinum also readies POEMS, its platform for open systems management. See page 57.

Data warehouses

CONTINUED FROM PAGE 1

learn about data warehouses at a very reasonable cost and see what benefits it will bring to your corporation," said William Parker, chief information officer at Agway, Inc. in Syracuse, N.Y.

The company uses a relatively small 15G-byte data warehouse based on NCR hardware to build customer profiles for its sales force. Using information from the data warehouse, an Agway sales representative can quickly build customer profiles that show purchasing patterns, product preferences and the money a customer spends on Agway products.

A data warehouse is a large repository of highly refined information relating to a corporation's business core that is culled from a variety of sources. Different user departments can access and customize the warehouse. It contains multiprocessor hardware platforms that run several layers of database software.

Typically, setting up data warehouses has been expensive, time-consuming and resource-hogging, said Ken Rudin, an analyst at Emergent Corp., a consultancy in San Mateo, Calif. "One of the things that is most important with the NCR program is the concept of a scalable database where people have the ability to start small and then grow rapidly to a full production system," he said.

That approach will help users "minimize the risk and exposure of going to a new technology like data warehousing," said Howard Richmond, a vice president at Gartner Group, Inc. in Santa Clara, Calif.

Trial run

Under NCR's program, corporations can evaluate data warehousing on a trial basis for $30,000 to $50,000. The 15-day program lets organizations build a prototype with their own data by using NCR hardware, relational databases and query tools.

NCR will also help first-time users set up fully functional departmental warehouses under a guaranteed fixed-fee program.

NCR will work with companies to pull together information that will go in the data warehouse, transform the data as required, build a client/server user interface and install the hardware. That program starts at around $800,000 and comes with a 90-day implementation guarantee that protects users from cost overruns, according to Robert Donald, assistant vice president of marketing at NCR.

Data mining by degrees

Users get the following at each price point with NCR's scalable data warehouse program

NCR First Step (Prototype warehouse)	NCR RightStart (Departmental warehouse)	Custom Engagement (Full-fledged custom warehouse)
Price: $30,000 to $50,000	**Price:** $800,000 and up	**Price:** Depends on project size
Includes: • 15 days of on-site training • Plan for moving to a production environment • Evaluation of hardware • Relational database and query/analysis tools	**Includes:** • Guaranteed 90-day implementation • Professional services, including information discovery and data transformation • Installation and client/server user interface • Multiprocessor hardware and database software • Data warehouse tools	**Includes:** • Professional services, including information discovery, design services, implementation services, and support and enhancement services • Data warehouse database and tools • Partner referral services

Fault lines beneath Unix's terra firma

Charles Babcock

The Meta View

With two steps forward and one back, the Unix community lurches forward.

Why doesn't someone in the Unix community plant a stake in the ground and urge everyone to rally around a 64-bit version of the operating system?

There's no better time to close ranks than when you have to convince a lot of users that a change is in their best interest.

Moving to 64-bit Unix would be enhanced if users were guaranteed that it would run a broad set of applications, regardless of the brand name on their hardware.

As a matter of fact, all Unix vendors could adopt a common, core 64-bit Unix at minimum expense because a lot of the work already has been done. Remember the Open Software Foundation? It produced a core set of code and specifications around which a 64-bit Unix could be built. Digital adopted them and spent millions to build its Digital Unix system.

Wait a minute. Wasn't there also an attempt to rally the troops at UniForum in February? Yes, but some of the most important combatants didn't show up.

Hewlett-Packard and SCO (the new owner of UnixWare) teamed up and called for support for a future 64-bit Unix, called Summit 3DA, that they will jointly develop.

HP and SCO promise to combine three operating systems (HP-UX, SCO's OpenServer and what used to be Novell's UnixWare) into one, and together they hail this move as a step toward consolidated Unix.

It is a step — a baby step. A lot of Unixes still must be consolidated. They include Sun Microsystems' Solaris, IBM's AIX, Sequent Computer Systems' Dynix/ptx, Silicon Graphics' Irix and NCR's Unix System VR4, just for starters. Or consider Pyramid's Reliant Unix, HP Convex Technology Center's Scalable Parallel Processor-UX, Siemens Nixdorf's Sinix and Cray Research's Unicos. And while we're at it, let's throw in Unix from Data General.

IBM and Digital sent low-level representatives to the HP/SCO press conference that announced Summit and gave it their thin blessing, but the two have remained silent about when — if ever — they would adopt such a system.

Sun's Scott McNealy was openly defiant in a UniForum keynote. "We outshipped SCO, IBM and HP combined. For [HP and SCO] to try to do something without Sun involved — it won't happen." And McNealy is speaking from Sun's newfound strength in supplying the Internet with hardware and World Wide Web developers with the Java programming language.

For their part, Digital and Silicon Graphics have at least a year's lead on the others with their 64-bit Unix offerings, and they are unlikely to give up that lead.

Both are cashing in on the desire of large user sites to build big database transaction processing systems and data warehouses.

Digital and Silicon Graphics have a competitive advantage. Sixty-four-bit Unix gives a computer system the capacity to address 14G bytes — in the case of Digital Unix — or enough to handle the largest applications with room to spare.

It has a theoretical capacity of 16.7T bytes, and even the most ambitious users are a long way from depleting that. Thirty-two-bit systems, which include all other Unix offerings, usually address 2G bytes for applications.

Informix and Oracle understand the appetite for very large database applications and have released parallel versions of their systems to run on multiprocessor servers from Digital and Silicon Graphics.

So these initiatives outline the ongoing fissures within the fractious Unix community. Each of the Unix vendors represents a set of initiatives, and together they represent a kind of divisive strength. In its variety, the Unix community keeps innovating.

But I hope its members keep an eye open for the chance to find more common standards and shared APIs. In this fashion, with two steps forward and one back, the Unix community can lurch toward greater harmony.

Babcock is *Computerworld*'s technical editor. His Internet address is charles_babcock@cw.com.

Inside Lines

Amelio, Gates kiss Blarney stone

The blarney must have been flying on St. Patrick's Day in Seattle when new Apple Chairman and CEO Gilbert Amelio met informally with his Microsoft counterpart, Bill Gates. The meeting of the two book authors was initiated by Apple as a gesture to repair the decade-long love/hate relationship between Apple and its biggest third-party software developer. Hopefully, the green beer smoothed things over, because Wall Street wags suggested that Amelio consider borrowing some big bucks from billionaire Bill. That's because Apple is expected to post a whopping $200 million loss for the current quarter, which ends this week.

Andreessen red-faced over home page

Cruise to Marc Andreessen's home page, and you're in for a big disappointment. The Netscape Communications co-founder has adorned http://home/netscape.com/people/marca/index.html with nothing but a big image of his face, inexplicably tinted red. And that's it. Nothing else. No text, no interactivity, no cool Java applets like you'd expect. When we sent electronic mail to Marc asking for an explanation, "I've been busy" was the reply.

Steep learning curve

Novell is joining other major vendors by focusing on Internet services, but the company still has a way to go to carry it out. Novell admitted that its Web-based registration for its annual BrainShare conference last week didn't go as planned. Novell's Web servers receiving the information didn't support Multipurpose Internet Mail Extension (MIME) attachments (an Internet standard), making it pretty hard to process the attached registration forms. And for those users trying to register via CompuServe, the on-line service's mail doesn't support MIME either.

It's not nice to fool ESPN

Two Stanford University students lost their university computer system privileges last week after they tried to rig a contest on ESPNnet (http://espnet.sportszone.com). According to a story posted at the site, the students, one an electrical engineering major and the other a computer science major, swamped the polling system with votes and locked out others trying to cast ballots in the Battle of the Mascots contest.

New Web software talks the talk

PictureTalk in Pleasanton, Calif., is announcing software that lets users share presentations over the Web. Users download free client software and then, while participating in a conference telephone call, log in to the same URL. Users can then share and alter presentations or spreadsheets.

White House 'de'-coupled

Efforts to restrict Internet access often backfire. A filter designed to block kids from finding nasty surprises deemed Bill & Hillary and Al & Tipper obscene. The namesake tool from SurfWatch Software in Los Altos, Calif., blocked access to the White House home page because it contained the word "couples."

'Smelly Cat' fools phone security

The Internet mailing list Best of Security last week warned that singing voices can fool telephone tone-detection equipment. It seems a man played Hare Krishna chants into his girlfriend's answering machine and the machine replied, "Enter access code for remote operation." Someone else reported that his answering machine thinks that Lisa Kudrow and Chrissie Hynde singing harmony on "Smelly Cat" sounds like an asterisk, or end-of-message signal. "Maybe the machine just has taste," he suggested.

FBI agents arrested a former IS staffer at Philip Morris and charged him with masterminding an elaborate scheme to defraud eight banks of $323 million in loans for an alleged "secret" Philip Morris project to develop an alternative to cigarettes. Edward J. Reiners, 51, is believed to have worked with a female accomplice under the fraud scheme known as Project Star, in which Reiners told lending banks the money was to be used to lease computers to develop the cigarette alternative. Reiners left Philip Morris' IS group four years ago. If you want to drop a dime on an IS manager gone bad, call our crime-stoppers hot line at (508) 820-8555. If you don't have a dime, call (800) 343-6474. News editor and part-time detective Patricia Keefe can be reached at (508) 820-8183 or via the Internet at tish_keefe@cw.com.

The 5th Wave by Rich Tennant

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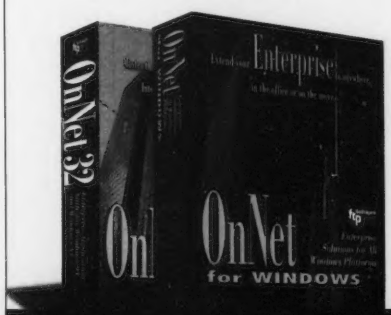

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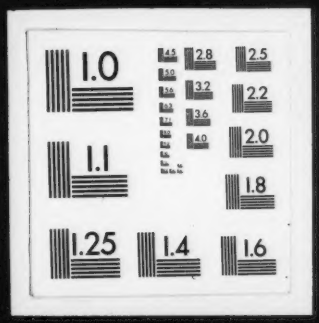
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